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Groups mull plan for U.S. business net

By Barton Crockett
Senior Editor

AUSTIN, Texas — A consortium of leading corporations last week announced plans for a nationwide network designed to spur intercompany communications and significantly boost U.S. competitiveness.

Microelectronics and Computer Technology Corp. (MCC), based here, said it will oversee development and operation of the Enterprise Integration Network (EINet), a nonprofit router-based network that will support a range of commercial services to help companies interact electronically.

While EINet will be architecturally similar to the Internet, it will carry commercial traffic and offer better security features, according to Allan Schiffman, chief technical officer at Enterprise Integration Technologies Corp., a research organization in Palo Alto, Calif., that is helping to design EINet.

Additionally, MCC has pledged to use EINet as a test bed for new application-level interoperability services and technologies.

Four leading U.S. industrial organizations last week pledged support for EINet, arguing that it

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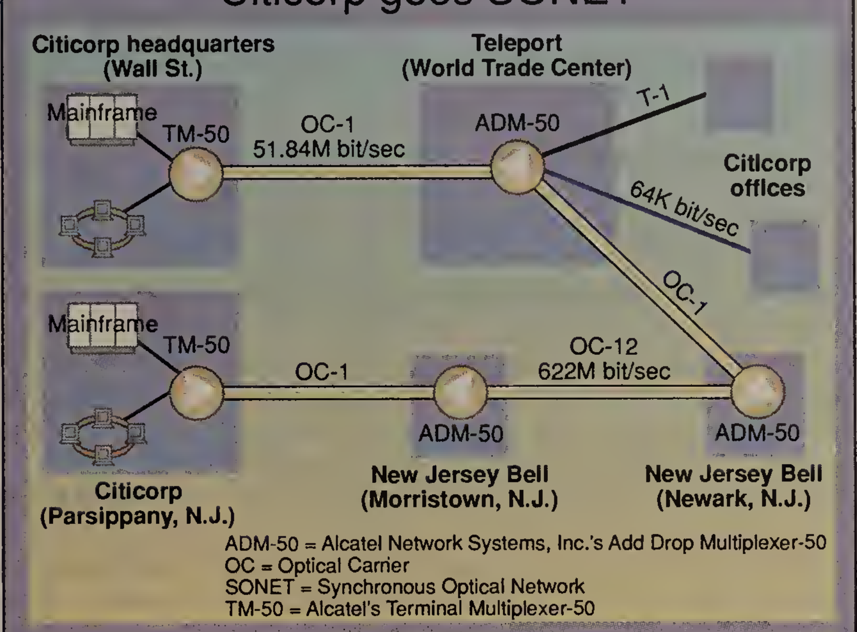
Citicorp goes SONET


Citicorp headquarters (Wall St.)
Teleport (World Trade Center)
Mainframe
TM-50
OC-1
51.84M bit/sec
ADM-50
T-1
Citicorp offices
64K bit/sec
OC-1
Mainframe
TM-50
OC-1
OC-12
622M bit/sec
ADM-50
ADM-50
Citicorp (Parsippany, N.J.)
New Jersey Bell (Morristown, N.J.)
New Jersey Bell (Newark, N.J.)

ADM-50 = Alcatel Network Systems, Inc.'s Add Drop Multiplexer-50
OC = Optical Carrier
SONET = Synchronous Optical Network
TM-50 = Alcatel's Terminal Multiplexer-50

Citicorp teamed with Teleport and New Jersey Bell Telephone Co. to establish a SONET link supporting bulk file transfers and LAN interconnection. From a Teleport central office, Citicorp can add or drop T-1 and 64K bit/sec links to other sites served by Teleport.

GRAPHIC BY SUSAN SLATER SOURCE: TELEPORT COMMUNICATIONS GROUP, NEW YORK

Citicorp builds SONET net with help of rival carriers

By Bob Wallace
Senior Editor

NEW YORK — Citicorp last week said it has teamed with Teleport Communications Group and New Jersey Bell Telephone Co. to establish one of the first private SONET nets in the U.S.

Working with the unlikely pair of partners, Citicorp has set up a 51.84M bit/sec Synchronous Optical Network connection between its headquarters here and a data center in Parsippany, N.J., to support bulk file transfers and local-area network interconnection.

The link passes through Teleport's World Trade Center central office here, from which Citicorp can add and drop T-1 and 64K bit/sec links to other buildings in the city.

Citicorp chose the SONET net, which will replace an unspecified number of T-1 lines, because it provides more flexibility in adding bandwidth to support new applications. It was also less ex-

(continued on page 58)

AT&T to air frame relay service strategy

Carrier this week will join frame relay fray with nationwide service based on StrataCom muxes.

By Bob Brown, Paul Desmond and Bob Wallace
Network World Staff

NEW YORK — AT&T is expected today to announce a frame relay service, based on StrataCom, Inc. IPX multiplexers, that will be rolled out in most major U.S. cities in the second quarter of next year.

The selection of StrataCom's multiplexers to support AT&T's InterSpan Frame Relay Service surprised many analysts who had expected the carrier to base the offering on AT&T Network Systems' Broadband Networking Switch (BNS)-2000.

Another surprise is that the service will be sold to users on an individual-contract basis, rather than through a general tariff, a move that may set the stage for objections from rival carriers.

The frame relay service, which AT&T intends to roll out internationally, is one of a family of new InterSpan services to be announced this week.

Also on tap is InterSpan Access Service, a dial-up data service that provides access to databases and messaging systems on a flat-rate basis. In addition, AT&T will unveil the InterSpan Locator Service, an offering that allows retailers to advertise a single telephone number nationally that puts callers in touch with the nearest store. It was developed in conjunction with Domino's Pizza,

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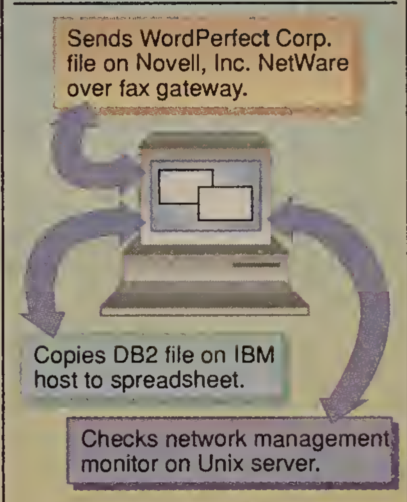
Microsoft's universal client architecture


Sends WordPerfect Corp. file on Novell, Inc. NetWare over fax gateway.
Copies DB2 file on IBM host to spreadsheet.
Checks network management monitor on Unix server.

Future versions of Microsoft Corp. Windows will support multiple protocols and provide simultaneous access to a wide range of net resources.

GRAPHIC BY SUSAN SLATER

Windows to be universal net interface?

Second in a three-part series examining Microsoft Corp.'s networking strategy.

By Timothy O'Brien
West Coast Bureau Chief

As more pieces of Microsoft's long-term networking strategy come to light, it is becoming clear the company is looking to position Windows as the industry-standard desktop interface to networks.

In Microsoft's vision of this "universal client architecture," customers would use Windows as a consistent user interface to multivendor servers, distributed applications, network services and other net resources.

After failing to win broad support for OS/2 or LAN Manager,

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NETLINE

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AMERITECH PLACES GIANT order for CO switches that comply with ISDN spec. Page 4.

CITICORP HATCHES PLAN to consolidate nets to save $100 million. Page 4.

HOSPITALS TRIAL SMDS offering from Southwestern Bell. Page 4.

SYNOPTICS SERVES UP Series 3000 hub module for token ring on telephone wire. Page 4.

VIRUS PACK SNUFFS OUT unwanted infiltrators in DOS, NetWare environments. Page 5.

DEFENSE DEPT. to overhaul Washington area net. Page 6.

BORLAND OUTLINES plan for object-oriented groupware. Page 59.

NEWSPAPER

FEATURE

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ISDN equipment boom gives users more options

By Chuck Kanupke
Special to Network World

From a network services perspective, this certainly hasn't been the long-awaited "Year of ISDN." But it has been an active year in the ISDN equipment arena as the number of vendors offering ISDN gear nearly doubled.

The growing number of new Integrated Services Digital Network products hitting the market augurs well for the future of ISDN because users will be able to choose from a greater number of terminal adapters, private branch exchanges, multiplexers and gateways.

As evidence of the growth in the ISDN equipment market, the number of firms providing ISDN terminal adapter and personal computer plug-in boards rose from 16 in last year's Buyer's Guide to 26 this year.

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Microsoft rolls out new client/server E-mail pack

Software giant also unveils a database API for Windows modeled after SQL Access Group spec.

By Timothy O'Brien
West Coast Bureau Chief

REDMOND, Wash. — In two Windows-related announcements last week, Microsoft Corp. clarified its electronic mail application strategy and established a database connectivity application program interface (API) for Windows.

With the announcement of Microsoft Mail Version 3.0 for PC Networks and the Open Database Connectivity (ODBC) API, Microsoft is positioning its Windows product as a common client interface for mail-enabled applications as well as applications that need connectivity to back-end database servers.

"Microsoft is building on a strategy of providing a Windows client interface to multivendor services, and now it will include messaging and database services," said Jamie Lewis, editor of the "Clarke Burton Report" in Salt Lake City.

Microsoft Mail Version 3.0, which is based on the Network Courier software that Microsoft acquired when it bought Consumers Software, Inc., employs a new client/server architecture in which the front and back ends can be used separately.

The new Windows-based mail user interface can be used with Microsoft Mail or employed inde-

(continued on page 59)

Software aids in drafting RFPs, evaluating responses

Strategic Systems Solutions offers PC-based tool.

By Wayne Eckerson
Senior Editor

ORLANDO, Fla. — Strategic Systems Solutions, International (SSSI) last week announced software that automates the process of developing requests for proposal and evaluating vendor responses.

The personal computer-based software, called The Product Analyzer, reduces administrative costs of processing responses to RFPs and provides an objective format for evaluating vendor proposals according to criteria deemed important by users.

SSSI, an information technology consulting firm, developed the software to expedite the process of issuing and evaluating RFPs for its customers, which are primarily large foreign banks.

Before developing The Product Analyzer, SSSI used as many as eight data entry people to key vendors' RFP responses into a spreadsheet application to perform comparative analysis.

"We couldn't find software on the market that automates and manages the RFP process, so we developed our own product," said Tom Spano, SSSI vice-president. "[The Product Analyzer] saves hours of administrative work and makes it much easier and quicker to objectively analyze vendor proposals."

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Timeplex bolsters muxes, shifts net mgmt. strategy

By Paul Desmond
Senior Editor

WOODCLIFF LAKE, N.J. — Timeplex, Inc. last week announced enhancements that enable its Link+ T-1 multiplexers to support high-speed switched data and ISDN services, and improve the ability of its T-3 multiplexer to respond to net failures.

The company also made good on its promise to bring its TX3/SuperHub T-3 multiplexer under control of the management system used for its T-1 multiplexers and other products. In addition, Timeplex announced a new packaging strategy for its net management systems that enables users to purchase only the elements they need.

To address switched data services, Timeplex unveiled a new board for its Link+ family, dubbed the ILQ module, that supports access to switched 56K or 64K bit/sec services via its single wide-area T-1 or E-1 link, said Mike Shumway, product manager for Link products. Users can assign any number of channels on a T-1 to such services, leaving the rest to support private net trunks or other carrier-based services.

The ILQ module can also pool

(continued on page 8)

Briefs

F-PROT virus tool available on BBS. The newest version of the F-PROT shareware package is now available on *Network World's* Bulletin Board System (BBS), which can be accessed by following the instructions in the table of contents below. F-PROT placed first in the *Network World*/National Computer Security Association (NCSA) Network Security Test series of virus removal tools ("Good virus protection comes cheap, test shows," *NW,* Oct. 21). The shareware can also be obtained from the NCSA's BBS by dialing (202) 364-1304.

IBM to license APPN net node code. IBM is expected to announce next month that it will license to third parties Advanced Peer-to-Peer Networking (APPN) source code for network nodes. APPN network node specifications define intermediate routing and directory search capabilities in an APPN net. Net nodes differ from APPN end nodes, which request network resources from and register with network nodes. APPN enables nodes to interact as peers, rather than relying on mainframes and front-end processors to dictate routing.

AT&T Tridom forges net mgmt. links. AT&T Tridom last week said its Clearlink Network Control System can now be used with AT&T's Accumaster Integrator and IBM's NetView network management systems. Clearlink is the management system for AT&T Tridom's very small aperture terminal satellite networks. The interfaces will enable users of Accumaster Integrator and NetView to monitor AT&T Tridom VSAT nets as elements of larger enterprise networks. The interfaces are available now for $10,000 each.

MFS and Centel nets to be linked. Metropolitan Fiber Systems, Inc. (MFS) and Central Telephone Company of Illinois (Centel) last week announced an agreement to link their respective nets in Chicago.

Under the agreement, MFS will offer network services that are now available in downtown Chicago to business customers in the Northwest suburbs currently served by Centel. Centel will be able to use the MFS net to reach long-distance carriers' points of presence and users located in the Chicago loop. The arrangement "will establish backup routing for the transmission of both voice and data services," said Richard Vanderwoude, Centel's president.

BT adds U.K. EDI node. BT North America, Inc. last week said it has expanded its EDI*Net electronic data interchange service to Europe by installing an EDI switch in the U.K. The node will enable European customers to route EDI traffic through the U.K., rather than using transatlantic facilities to access an EDI switch in the U.S.

Software AG targets client/server. Software AG of North America, Inc. next month is expected to announce that it has ported its Adabase database management system and its Natural fourth-generation language to client/server architectures. The company is also expected to unveil a product that enables Microsoft Corp. Windows workstation users to access multiple databases on different servers. Currently, Software AG's products run primarily on IBM mainframes.

QPSX wins MAN net deals. QPSX Communications, Ltd. has announced contracts to provide Telecom Australia and Bell Atlantic Corp. with products that will enable the carriers to build commercial, high-speed metropolitan-area networks. The Telecom Australia deal, expected to be worth about $30 million, calls for QPSX to provide equipment for a high-speed service that will enable customers to link private nets with switched facilities.

Bell Atlantic decided on the QPSX technology after using its equipment in a nine-month field trial with Temple University in Philadelphia in which 18 local-area networks were linked using Switched Multimegabit Data Service running at 155M bit/sec.

BellSouth reveals ISDN plans. BellSouth Telecommunications last week outlined plans to provide Integrated Services Digital Network Centrex services in states within its region where ISDN tariffs have been approved by regulators. It also intends to deploy by the end of 1992 a mix of other ISDN services targeted at specific businesses and residential customers. The services will include MegaLink ISDN — a Primary Rate Interface offering — and Single Line Service for businesses and residents — a Basic Rate Interface offering.

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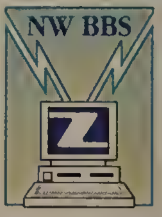

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Ameritech orders switches supporting National ISDN 1

Purchase of 276 new units, switch upgrades will hasten availability of advanced ISDN services.

By Bob Wallace
Senior Editor

CHICAGO — Ameritech last week announced the largest purchase of central office switches supporting the National ISDN 1 standard in what industry watchers say is the strongest show of support yet for the specification.

Ameritech said the switch purchase will enable it to hasten rollout of Integrated Services Digital Network Basic Rate Interface (BRI) service.

Today, only 15% of Ameritech's lines can support ISDN, but when the network modernization project is concluded in 1996, 80% of the carrier's lines are expected to support BRI.

The switch upgrade will also speed deployment of digital Centrex and Custom Local Area Signaling Services, including caller identification.

"The [purchase] will definitely allow us to accelerate deployment of ISDN throughout our region," said Mike LeBeau, director of Centrex/ISDN product management for Ameritech. "What this represents is a firm commitment to deploy standard ISDN technology in our central offices."

Ameritech said it has placed orders for 276 digital central office switches and upgrades to existing switches with AT&T, Northern Telecom, Inc. and Siemens Public Switching Systems, Inc. as part of a five-year network modernization effort that will cost $1.05 billion.

National ISDN 1 push

The switch replacements and upgrades will bring advanced communications capabilities to 80% of the Ameritech Bell operating companies' 16.4 million lines by 1996, a 45% increase over an earlier plan.

> "The [purchase] will definitely allow us to accelerate deployment of ISDN," LeBeau said.
>
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The carrier's only stipulation was that the vendors supply switches with built-in support for National ISDN 1 or the capability to upgrade to it at a later date.

National ISDN 1 is a collection of Bell Communications Research technical references that define how customer premises equipment accesses an ISDN switch and how different vendors' switches interoperate using a Common Channel Signaling System 7 network.

"If this [purchase] doesn't make ISDN fly, nothing will," said Ian Angus, president of Angus TeleManagement Group, Inc., a Pickering, Ontario, consultancy specializing in ISDN and intelligent networks. "This is a major vote of confidence for National ISDN 1."

Northern Telecom, AT&T and Siemens pledged to implement National ISDN 1 in their products at a gathering in March of the ISDN Executive Council of the Corporation for Open Systems International in New York ("Carriers, CPE firms pledge support for ISDN strategy," *NW,* March 4).

LeBeau said National ISDN 1 will eliminate problems with incompatibilities among different vendors' switches and between customer premises equipment and central office switches.

"Each switch vendor has its own proprietary implementation of the ISDN protocols," LeBeau said. "As a result, there was no feature interoperability among different vendors' switches, and users couldn't use one vendor's CPE with another vendor's [central office] switch."

The latter problem has kept users from expanding their ISDNs. "Users have been trapped on islands of ISDN," said Jim

(continued on page 6)

Citicorp opts for network consolidation to cut costs

By Barton Crockett
Senior Editor

NEW YORK — Citicorp last week announced plans to streamline management of its networks worldwide in an effort to slash annual communications expenditures by $100 million.

Citicorp said it will form a new unit to oversee the consolidation of more than 100 networks in 92 countries, enabling it to significantly curtail net expenses in the face of sagging profits.

The unit, called the Global Information Network, will begin operations Jan. 1 and will be headed up by Howard Brooks, formerly vice-president and general manager of international value-added services at the Sprint International division of US Sprint Communications Co. Brooks will report to Colin Crook, chairman of Citicorp's Corporate Technology Committee.

Citicorp has also culled a committee of 70 telecommunications professionals from its units worldwide that will meet over the next few months to chart the bank's net consolidation effort.

According to a top Citicorp official who will sit on the newly created network consolidation committee and who asked to remain anonymous, the consolidation represents a dramatic shift from Citicorp's historically decentralized approach to network management.

Even though Citicorp spends hundreds of millions of dollars annually on networking and employs about 400 network professionals worldwide, the banking giant has never before consolidated network control into a single corporate group.

Instead, business units independently purchased network services, often obtaining discounts that seldom benefited other business units.

"Certain large divisions have entered into things like Tariff 12 arrangements, which other divisions can't even benefit from," the unnamed executive said.

The official insisted the decentralized approach has served Citicorp well in the past by freeing divisions to use networks in the manner best suited to their business sector. But now that profits are dwindling, top management is latching onto network consolidation as a way to cut costs.

The source said he expects much of the savings will come from volume purchase discounts. Additionally, Citicorp will examine ways to use new advanced technologies, such as frame relay and Switched Multimegabit Data Service, to save money and improve service.

But any physical network consolidation may actually be minimal since each of the business units operate disparate nets that Citicorp may not be able to economically combine, the source said.

It is also unlikely Citicorp will outsource its network to a vendor or lay off many staffers, he said.

"It will not be a Merrill Lynch [& Co., Inc.] move, if you know what I mean," the source said, referring to the brokerage firm's decision two years ago to hand over its net operations and staff to IBM and MCI Communications Corp. "The chairman is not going to get on a soapbox and say we're going to fire 800 people and turn the whole thing over to MCI."

Southwestern Bell embarks on SMDS trial with users

After trial, carrier hopes to tariff service by 1993.

By Wayne Eckerson ·
Senior Editor

HOUSTON — Southwestern Bell Telephone Co. last week began a trial with two hospitals here of a Switched Multimegabit Data Service (SMDS) it hopes to offer on a tariffed basis within two years.

The one-year trial will initially provide T-1 speed switched connections to four sites at the Baylor College of Medicine and four sites at the University of Texas M.D. Anderson Cancer Center. Next year, Southwestern Bell will increase the trial service speed to DS3 rates.

The two hospitals will use SMDS to support the transmission of medical images, such as magnetic resonance imaging, computerized axial tomography (CAT) scans, X-rays and pathology slides, within their medical complex and with each other through the SMDS nodes. It will also be used for local-area network interconnection, videoconferencing and bulk file transfers.

"If the trial works, we may use SMDS rather than extend our fiber network to encompass all our sites, which would be much more expensive," said Marilyn Katzman, director of telecommunications at the M.D. Anderson Cancer Center here.

Marty Tanner, manager of product development at Southwestern Bell, said the carrier will announce an SMDS next year and make services commercially available in 1993.

This is the third SMDS trial conducted by Southwestern Bell, but the only one with end users. The first trial was conducted in a Southwestern Bell laboratory, while the second used Southwestern Bell's internal data network. Bell Atlantic Corp. and Pacific Telesis Group have also announced customer trials of SMDS.

Southwestern Bell will pro-

(continued on page 6)

SynOptics 3000 series hub module supports UTP wire

Model 3505A works on 16M bit/sec token-ring LANs to minimize signal distortion at high speeds.

By Maureen Molloy
Staff Writer

SANTA CLARA, Calif. — SynOptics Communications, Inc. last week announced a module for its 3000 series hub that supports 16M bit/sec token-ring LANs on unshielded twisted-pair wire.

The Model 3505A UTP Token Ring Host Module is based on new unshielded twisted-pair technology that the company jointly developed with IBM ("IBM, SynOptics devise 802.5 wiring scheme," *NW,* Nov. 11). Both companies attended an Institute of Electrical and Electronics Engineers, Inc. 802 plenary committee meeting last week to propose the new 16M bit/sec unshielded twisted-pair technology for inclusion in the IEEE 802.5 token-ring standard.

Model 3505A minimizes the signal distortion that occurs with unshielded twisted-pair wiring at high speeds by providing for regeneration and retiming of signals at each network interface port within the hub. Current unshielded twisted-pair token-ring models provide retiming only on the adapter card.

"SynOptics' technology will let users use older, less expensive unshielded twisted-pair wire for high-speed token-ring transmissions because the signal is boosted at the hub," said Charlie Robbins, director of communications research at Aberdeen Group, Inc., a Boston-based consultancy.

With existing unshielded twisted-pair technology, the use of lower grade cable to support 16M bit/sec token-ring speeds would result in unacceptable signal distortion and interference.

Proteon, Inc. also offers a module supporting 16M bit/sec token rings over unshielded twisted-pair wire. But the vendor's unshielded twisted-pair technology is based on what Carl Blume, the company's senior product manager, calls passive circuitry, as opposed to the SynOptics-IBM active circuitry approach.

> "SynOptics' technology will let users use older unshielded twisted-pair wire for high-speed token-ring transmissions."
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(continued on page 61)

Antivirus tools earn high praise

By Caryn Gillooly
Senior Editor

BATON ROUGE, La. — Fifth Generation Systems, Inc. today will release new stand-alone and networked antivirus products that early users say are the most comprehensive tools they have employed to date.

The software packages include Untouchable for virus protection on a DOS personal computer and Untouchable Network for Novell, Inc. NetWare local-area networks. Both packages detect and eliminate known and unknown viruses.

Using the network version, an administrator can monitor and control virus activity for personal computers on an entire network.

"Six new viruses are created every day — 38,000 are expected to be around by 1994," said Vicky Gore, product marketing manager for Fifth Generation, based here. "Our niche is that we can offer protection against both known and unknown viruses."

Fighting the problem

The products include three components that root out and destroy viruses: a file scanner, a terminate-and-stay-resident (TSR) monitor and a virus scanner/remover.

The file scanner uses file modification detection to determine if viruses have been added to executable files on the workstation. When first installed, Untouchable registers all files in on-line and off-line encrypted databases. The off-line database is kept separate from the system and should be updated periodically.

As the user boots the machine, the scanner performs an integrity test of all prespecified files, comparing check sums with the original check sums recorded in the on-line database.

If a virus is detected, Untouchable removes the virus and reconstructs infected files using the on-line database. If that is infected, the user can reconstruct the file using the off-line database. Untouchable will only perform the file scan once a day, even if users boot up several times.

The TSR monitor scans the system's memory for known boot-sector and partition-table viruses — two virus types that do not infect by attaching to executable programs, but rather through the machine's boot sector and hard disk.

The TSR monitor scans each file before execution and checks every diskette inserted into a floppy drive.

The virus scanner/remover is automatically run during program installation to verify that the program is clean. It is also automatically launched to check all new files and programs for viruses before they are added to either database.

The entire program requires about 5K bytes of conventional memory.

Untouchable Network provides the same capabilities as the stand-alone version but includes additional net-oriented features.

For example, it enables an administrator to automatically install and update the software on all personal computers from a central location. The network version also provides an alert mechanism to tell the administrator if a virus has been detected at a workstation. It keeps an ongoing status report of infections, as well as historical logs of all status reports and virus alerts.

The company is working on versions for Microsoft Corp. LAN Manager and Banyan Systems, Inc. VINES networks.

The user view

"I've used all kinds of antivirus tools," said Chas Thompson, network support engineer for Advanced Information Systems in Grand Rapids, Mich. "Most of them had scanners that were really slow, and some gave me more problems than I started out with. Not only does this just fly through [the scan], it takes more things into account than any other package I've seen."

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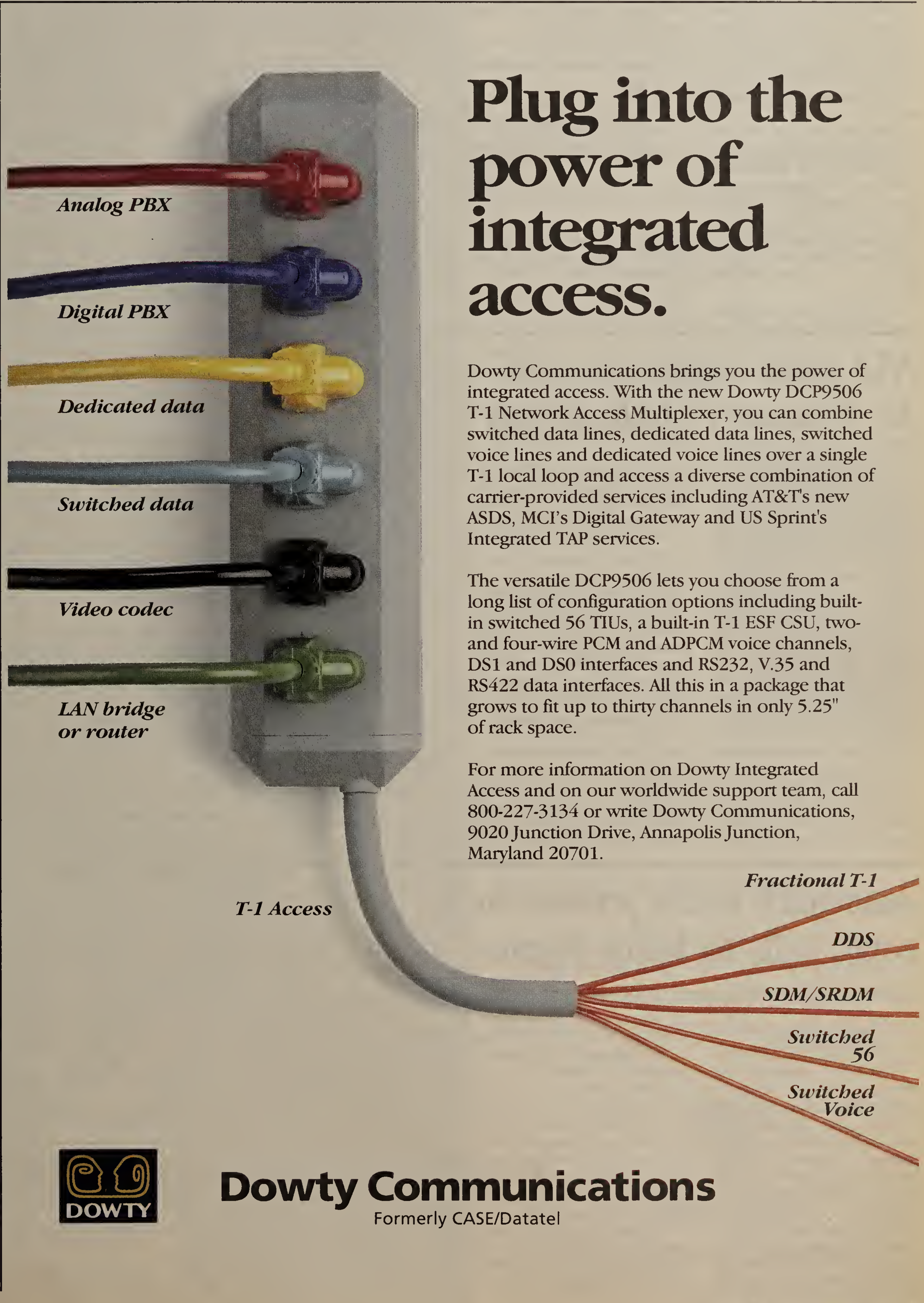

Plug into the power of integrated access.

Dowty Communications brings you the power of integrated access. With the new Dowty DCP9506 T-1 Network Access Multiplexer, you can combine switched data lines, dedicated data lines, switched voice lines and dedicated voice lines over a single T-1 local loop and access a diverse combination of carrier-provided services including AT&T's new ASDS, MCI's Digital Gateway and US Sprint's Integrated TAP services.

The versatile DCP9506 lets you choose from a long list of configuration options including built-in switched 56 TIUs, a built-in T-1 ESF CSU, two- and four-wire PCM and ADPCM voice channels, DS1 and DS0 interfaces and RS232, V.35 and RS422 data interfaces. All this in a package that grows to fit up to thirty channels in only 5.25" of rack space.

For more information on Dowty Integrated Access and on our worldwide support team, call 800-227-3134 or write Dowty Communications, 9020 Junction Drive, Annapolis Junction, Maryland 20701.

Dowty Communications
Formerly CASE/Datatel

Defense Dept. taps RBHC to overhaul D.C. area net

Bell Atlantic will replace agency's analog voice service with new digital voice and data facilities.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — The Department of Defense last week awarded Bell Atlantic Network Services, Inc. a contract to replace the agency's analog voice net here and in the surrounding areas with digital voice and data services.

Under the 10-year Telecommunications Modernization Project (TEMPO), the Defense Department will migrate an unspecified portion of its 138,000-line Centrex voice service to Integrated Services Digital Networks and will use new facilities for local-area network interconnection.

TEMPO will also give the Defense Department a new network management control center, which will provide the agency with greater control over billing and traffic monitoring.

> The department will migrate an unspecified portion of its 138,000-line Centrex voice service.
>
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AT&T, a subcontractor for the TEMPO contract, will offer the department a wide selection of ISDN cards, private branch exchanges, modems and ISDN telephones, while Reston, Va.-based SMS Data Products Group, Inc. will provide the LAN interconnection services.

Pat Burke, project manager for TEMPO at Defense Telecommunications Service-Washington, the Defense Department's local telecommunications staff, said the agency has not yet settled on a master plan for future network installations at its 280 locations in the Capitol area.

The Defense Department locations vary in their line requirement, Burke pointed out, noting that a local recruiting station might have only 4 lines, whereas

(continued on page 60)

NSA pack supports APPC in Windows applications

By Paul Desmond
Senior Editor

LAGUNA HILLS, Calif. — Network Software Associates, Inc. (NSA) last week unveiled software that enables Microsoft Corp. Windows-based applications to use IBM's Advanced Program-to-Program Communications protocol for communicating as peers with applications running on an array of other machines.

NSA's DynaComm/Elite APPC also works with a variety of Windows-based application development tools to build support for APPC/LU 6.2 — IBM's protocol for peer-to-peer communications — into Windows applications.

Although it is not the first product of its kind on the market, NSA said its offering works with a wider variety of connectivity options than competitive wares and will spur development of Windows-based APPC applications.

"We're seeing a lot of interest in Windows because it's much better than DOS ever was as an APPC platform," said Russ Hertzberg, director of product marketing at NSA, based here. "The memory management is so vastly improved under Windows that users can really write a decent-size application and not worry about running out of system memory."

Digital Communications Associates, Inc. offers a similar product, dubbed Irma WorkStation for Windows. Also, a spokeswoman for Systems Strategies, Inc. said her company is working on a Windows-based APPC product that will be available in mid-1992.

Hertzberg said NSA's offering outshines the competition because it supports numerous connectivity options, including Synchronous Data Link Control, coaxial cable in distributed function terminal mode, Network Basic I/O System local-area networks; Novell, Inc. NetWare Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) LANs and IEEE 802.2 Logical Link Control-based LANs.

DCA does not support IPX/SPX, and its product works only with DCA or IBM 3270 adapters, whereas NSA's product works with about 30 adapters from a variety of vendors.

That was an important feature to Reid Rust, advisory software engineer in the research and development group at Acxiom Corp. in Conway, Ark., a beta user of the new NSA product who also uses DCA's comparable offering.

(continued on page 58)

Ameritech mulls product to route calls to home agents

Tests Unifi's PhoneServer as versatile call router.

By Ellen Messmer
Washington Correspondent

CHICAGO — Ameritech Services, Inc. plans to beta-test a product this January that works in tandem with Integrated Services Digital Network services to redirect a company's incoming service calls, along with customer data files, to agents working from their homes.

If the tests prove successful, Ameritech Services said it may package the Unifi Communications Corp. PhoneServer controller/router with its own ISDN Basic Rate Interface (BRI) services and tariff the offering as a call distribution service.

The benefit of such a service would be that customers would not need an on-premises automatic call distributor (ACD) or a private branch exchange configured as an ACD in order to route calls to home-based agents.

Ameritech Services will use its own Illinois Bell Telephone Co. Service Center as the test site for the project, although it said several customers will also be participating in the trials.

Ameritech, the parent of Ameritech Services, owns a minority stake in Unifi.

The call-routing process

In Ameritech Services' product trial, service calls to the center will be routed to 80 home-based service agents via the PhoneServer controller/router in the Illinois Bell Service Center.

As the call-routing process begins, the PhoneServer, primed with a caller's automatic number identification information from an ISDN-capable central office switch, will simultaneously access the customer's file from a nearby corporate data center.

(continued on page 60)

Software distribution tool gets LU 6.2, VTAM support

Lets hosts parcel out software to net resources.

By Jim Duffy
Senior Editor

FARMINGTON, Conn. — Telepartner International last week introduced an upgraded version of its Synchrony application distribution software that supports IBM's LU 6.2 protocol and VTAM.

Support for LU 6.2 in Version 2.2 of Synchrony allows for faster data transfers between workstations and host computers, while the VTAM support opens a new market niche.

Previously, Synchrony only ran under CICS.

Synchrony, which automates distribution of software and data from hosts to distributed workstations and local-area networks, includes three software components: Workstation, which runs on DOS and OS/2 workstations in the network and sends and receives programs as well as data; Communications Manager, which resides on an IBM MVS mainframe, storing and serving software; and Administrator, which runs on DOS or OS/2 workstations, controlling and monitoring software distribution.

Users of Workstation can enter commands to initiate uploads or downloads of software on an attended or unattended basis.

Unattended transmissions occur automatically when the workstation would not otherwise be in use.

The LU 6.2 advantage

LU 6.2 support will allow Synchrony to distribute and retrieve applications faster than the previously supported LU 2 sessions by making it possible to send larg-

(continued on page 59)

Ameritech orders switches

continued from page 4

Yeip, senior telecommunications analyst with Federal-Mogul, an auto parts firm in Southfield, Mich., and a large Centrex user. "If it works, Ameritech's plan would let users interconnect an AT&T Centrex with a Northern Telecom Centrex."

Making a commitment

Ameritech's plan to purchase the new National ISDN 1-compliant central office switches and upgrades to existing switches shows its commitment to the standard, LeBeau said. The regional Bell holding company hopes the purchase will motivate customer premises equipment vendors, including IBM and Digital Equipment Corp., to build National ISDN 1-compliant customer premises equipment.

Angus said the plan will do just that. "This purchase, which is possibly the largest single central office switch acquisition since divestiture, will send a strong signal to CPE vendors saying that they can begin volume production [of National ISDN 1] CPE."

Bill Wallace, ISDN product manager for Northern Telecom's DMS-100 central office switch line, predicted that other RBHCs will follow Ameritech's lead and equip their network switches to support National ISDN 1.

"Ameritech's move signals the beginning of the end for proprietary ISDN as we know it today," he said.

Carrier embarks on SMDS trial

continued from page 4

vide SMDS service to the two hospitals from an AT&T Bandwidth Network System (BNS) switch in a Southwestern Bell central office here. The BNS is AT&T's prototype Asynchronous Transfer Mode switch that will become commercially available at the end of next year.

Southwestern Bell will equip each hospital site with a router from either AT&T or Cisco Systems, Inc., according to Steve Krider, area manager of customer application analysis at Southwestern Bell. The router will be linked to the BNS switch via a dedicated T-1 circuit or through the carrier's self-healing fiber ring in Houston.

Krider said SMDS requires a dedicated link from a customer's premises to the SMDS switch. However, Southwestern Bell hopes that by using its fiber ring, it can reduce the cost of provisioning SMDS service throughout the city because it eliminates most or all of the dedicated access lines needed to link a customer's premises to the nearest SMDS switching center.

Katzman said the SMDS trial will provide high bandwidth transmission facilities to four buildings that are not currently linked to the center's fiber network. The center has 15 buildings in the Houston area and several more in Texas and other states.

Katzman said the M.D. Anderson Cancer Center will try to link the SMDS sites to its fiber net using switches at each location. "We view this as a wonderful opportunity to try things that, in theory, should work," she said.

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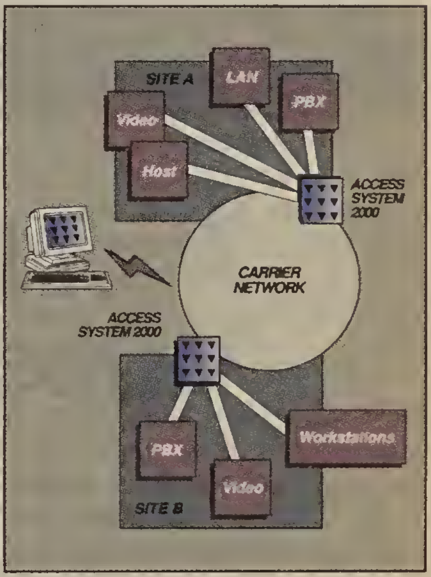

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Timeplex shifts net mgmt. strategy

continued from page 2

multiple switched 56K or 64K bit/sec links to provide greater bandwidth to a single application. Such a capability, known as inverse multiplexing, is useful for applications such as videoconferencing or as a backup for dedicated T-1 links.

With the addition of a second module, dubbed the D-Channel Module (DCM), the ILQ can also be used with an Integrated Services Digital Network Primary Rate Interface (PRI) line. Timeplex previously offered ISDN support only through a device separate from its T-1 multiplexers.

A few Timeplex competitors, such as General DataComm, Inc. and Newbridge Networks, Inc., offer features including PRI support and inverse multiplexing, although the latter capability is not integrated within their T-1 products.

"It's a timely introduction," said Steve Taylor, a principal with Distributed Networking Associates, a consultancy in Greensboro, N.C. "They're nice features that are going to allow the product to evolve with switched communications services. It gives you the option of having dial backup for the T-1 mux, which should be a significant cost savings in some nets."

Scheduled for first-quarter 1992 availability, the ILQ card costs $8,500, and the DCM costs an additional $3,500.

Timeplex also announced two enhancements that allow its TX3/SuperHub to recover faster from network failures.

The first is Preconceived Route Scenario (PRS), which lets users program an alternate route for critical applications riding over circuits ranging from a single T-1 to a full T-3, said Frank Troccoli, product manager for the TX3/SuperHub.

Should an application's primary circuit fail, the multiplexer will use the preconfigured alternate route, obviating the need for the network management system to supply reroute information. "Switching from one T-3 to another can happen in well under a second," Troccoli said.

Another enhancement, dubbed Automatic Alternate Routing (AAR), is intended to support faster rerouting during a more complex failure, such as the loss of an entire node.

Two specialized processors are installed on separate net switches to constantly monitor traffic. In the event of a major failure, the processors handle traffic rerouting, obviating the need for the network management system to collect information and correlate reroute scenarios.

Troccoli said that in a 20-node network, the system could respond to a T-3 failure and all related failures in five seconds.

AAR will be available with all new TX3/SuperHub systems in the second quarter of 1992. Upgrades for existing systems start at $5,000. PRS comes with the Time/View 3000 management system, a new offering Timeplex announced last week for the TX3/SuperHub.

In addition to adding the Time/View 3000, Timeplex revamped its network management strategy. Its umbrella management system, which runs on a Sun Microsystems, Inc. SPARCstation, is now called the Time/View Network Management System (NMS) and comprises modules specific to members of Timeplex's product line.

The change was made so that users can buy only the modules they need, while allowing modules to be integrated into a single logical system.

The Time/View 3000, which is also based on a SPARCstation, can now be monitored and controlled as part of Time/View NMS. The previous TX3/SuperHub management system, which was based on a Unisys Corp. personal computer, could only be monitored from Timeplex's umbrella management system.

The management system for Timeplex's Timepac X.25 packet switches can now be monitored, although not controlled, under Time/View NMS.

All the new or enhanced management products are expected to be available in the second quarter of 1992. Time/View 3000 starts at $10,000 for software only. ◻

Antivirus tools earn high praise

continued from page 5

Thompson, who uses Untouchable Network, said some particularly helpful features are the supervisor rights function, which lets him monitor the net centrally, and the off-line database, which Fifth Generation called a "safe disk."

"The concept of the safe disk really excited me," Thompson said. "Now I have a reliable place to compare" infected programs with noninfected programs.

Other users agreed that Untouchable gets the job done and without disrupting the user's work flow.

"We get virtually no performance degradation," said Ben Hope, LAN administrator at the National Institute of Health Library in Bethesda, Md. "And it takes five to six seconds maximum every morning to scan each machine." Other scanners, he noted, take twice that amount of time.

Hope said the product has an advantage over others in that it can detect unknown viruses. Other products that look for known virus must be constantly updated due to the rapid pace at which new viruses are being launched. "One of the nicest things about this is that it doesn't need constant upgrades," he said.

Untouchable is available now for $165. An Untouchable Network Starter Kit, also available now, costs $695. ◻

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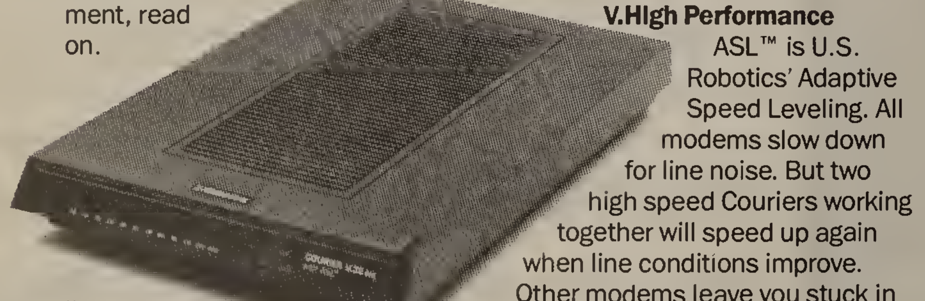

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

> "Because of our silence, I can see where the marketplace would get the perception that we didn't care [about the 16M bit/sec token-ring over unshielded twisted-pair wire market]. It's not that we didn't care; it's that we couldn't come up with the right answer soon enough."
>
> **Curt Dunbar**
> LAN product planning manager
> IBM
> Research Triangle Park, N.C.

People & Positions

Ungermann-Bass, Inc., a Santa Clara, Calif., maker of intelligent wiring hubs and other network equipment, last week announced a corporate restructuring in an effort to speed product delivery and improve customer service.

A handful of executive changes have been made as part of the restructuring.

Wayne Benoit, previously vice-president of engineering, has been named vice-president of product delivery. He will oversee products from design through their life cycle:

Bruce Brown has been promoted from general manager to vice-president in charge of field operations for the Americas and Australia.

Mike Gardner has been named vice-president of joint ventures, focusing on Ungermann-Bass' partnerships with other firms.

Steve Diamond, previously director of product planning, has been named group director of corporate strategy. His organization will be responsible for long-term strategy and business development.

Roger Bertman, previously vice-president of marketing, is on special assignment.

Ascend supports effort to create inverse mux standard

Company joins BONDING interoperability group.

By Bob Brown
Senior Editor

ATLANTA — Ascend Communications, Inc.'s recent decision to join an upstart consortium to develop a standard for interoperability among inverse multiplexers should help speed the standard development process, industry observers said.

Ascend's backing of the Bandwidth on Demand Interoperability Group (BONDING) unites the market leader for inverse multiplexers with other vendors and quashes concern that a separate standard will emerge ("Ascend, BONDING to diverge on spec," *NW,* Sept. 23).

BONDING's standards push also got a boost from the Switched Digital Services Applications Forum (SDSAF), which endorsed BONDING's effort to devise an Nx56/64K bit/sec interoperability standard rather than build its own.

SDSAF, which recently held a meeting here, is another vendor consortium whose charter is to promote the interoperability and use of switched digital products and services.

Ascend had previously expressed concern about joining BONDING because of possible conflict with SDSAF's interoperability group, independent testing and certification, and potential antitrust violations, said David Helfrich, vice-president of sales and marketing at Ascend.

The standard at issue will enable users to communicate between multiple vendors' inverse multiplexers to support bandwidth-on-demand applications, such as videoconferencing and LAN-to-LAN communications, according to Berge Ayvazian, a vice-president at The Yankee Group, a Boston market research firm.

Driven by bandwidth-on-demand applications, the market for inverse multiplexers is expected to soar from $12 million in sales this year to $250 million by 1994, according to a recent report by The Yankee Group.

"The installed base of inverse multiplexers is growing, and there's been a need for users to know that the vendors are going to bring interoperability to their installed bases," Ayvazian said. "There's no longer a BONDING controversy."

SDSAF's support for BONDING is important in that there needs to be a tight relationship between the carriers and customer premises equipment vendors since the carriers will provide

(continued on page 10)

INDUSTRY BRIEFS

Banyan, Microsoft ink technical support pact. Banyan Systems, Inc. and Microsoft Corp. last week said they have entered into a technical support alliance in which each vendor will act as a single point of contact to assist customers in resolving conflicts on nets using both Banyan and Microsoft products.

Under the agreement, Banyan will coordinate the service effort when contacted by a customer requesting support for a VINES network in which Microsoft's assistance is needed. Microsoft will respond likewise to its customer calls. The technical support agreement also calls for both companies' engineering and support staffs to receive additional training and to share access to each other's technical information database.

AT&T Paradyne announces layoffs. AT&T Paradyne last week began implementing staff cuts to offset lower than expected revenue from sales of its analog networking devices, a company spokesman said.

The staff reduction was called a "restructuring" by a company spokesman, who said the layoffs will occur gradually and across the board during the next eight to 12 months.

The spokesman said AT&T does not disclose the financial performance of its operating units. But he said much of AT&T Paradyne's 1991 revenue projections were dependent on sales of its analog modems, which lost business to competitors' digital data communications equipment.

(continued on page 10)

> "We'll see the increased use of client/server computing at corporations. Clearly, there are a lot of things you can do with the investment in PCs and LANs in a client/server model that are cost-effective outside the mainframe."
>
> ▲▲▲
>
> **Garry Betty**
> President and CEO
> Digital Communications Associates, Inc.

DCA chief redirects firm back to roots

DCA's Betty refocuses efforts on LAN-to-host links, stresses Irma support for multiple clients.

Q&A In the two years since Garry Betty became president, and later, chief executive officer of Digital Communications Associates, Inc., the Alpharetta, Ga., company has undergone a metamorphosis.

Betty arrived just as DCA was exiting the wide-area network business by selling its Network Communications Group to Racal Electronics PLC. He then refocused the company on its microcomputer-to-mainframe product line, overseeing the introduction of more than 25 products.

Betty spoke recently with *Network World* Senior Editor Bob Brown about the new DCA and how the company plans to keep pace with changing user needs and the evolving network industry.

Why did DCA exit the WAN business?

DCA's strategy was to provide end-to-end communications for Fortune 500 and other large companies. We approached it from the T-1 backbone with [products from] Cohesive [Network Corp.] to the desktop with a variety of products from Irma to CrossTalk.

However, the WAN business changed significantly from early 1989 through early 1990. In just one year, the T-1 business went from looking like a growth opportunity to one that proved very difficult in which to make money.

How has that strategy worked?

It's taken us a while to get going again because we starved the micro-to-mainframe communications business in that we did not devote the necessary R&D dollars to generate new products. Not generating enough new products caused us to fall behind competitively, and we lost market share.

However, we've started to regain a leadership position again as our business has become more clearly focused on PC communications-to-mainframes.

Now we've got products that let users easily support a variety of client environments, including DOS, [Microsoft Corp.] Windows and [Apple Computer, Inc.] Macintoshes.

With DCA out of the WAN business, is it relying too much on sales of its Irma boards?

No. Irma is not just coaxial hardware with a piece of software anymore. It's IrmaLAN, it's our Select Communications Server, it's Irmatrac, and it's Irma WorkStation for Windows.

Our plan is to exploit Irma as an interface and gain more revenue from some of these new products, many of which are software products, not boards.

How is DCA keeping pace with changes at IBM and with IBM's Systems Network Architecture strategy, such as the move to more peer-to-peer communications?

We do everything we can to ensure compatibility with IBM. [Advanced Program-to-Program Communications] is clearly the mechanism of choice from which customers will build peer applications today.

We already include APPC or LU 6.2 in our stand-alone Irma WorkStation for Windows product, our Select Communications Workstation product and our Select Communications Server product.

(continued on page 10)

BT set to resell StrataCom IPX T-1 multiplexer

By Paul Desmond
Senior Editor

LONDON — British Telecommunications PLC (BT) recently announced an agreement with StrataCom, Inc. under which BT's business communications group will resell StrataCom's IPX T-1 multiplexer.

The move was viewed as a shot in the arm for StrataCom due to BT's large presence in Europe, but it also raised some confusion for BT, which now has agreements with three major T-1 multiplexer vendors.

BT's business communications group, which sells data communications equipment to private network users, already resells Timeplex, Inc. T-1 multiplexers, said Stuart Munro, BT's general manager for data communications. Also, BT is using gear from Network Equipment Technologies, Inc. for a net being built by Syncordia Corp., BT's new global network outsourcing unit.

"They are really hedging their bets," said Jeff Held, a partner at the consultancy Ernst & Young in Vienna, Va. "They've put seed money into all of these ventures, and they're going to see which ones prosper."

Analysts expect the deal will give StrataCom the inside track to provide equipment supporting BT's frame relay service.

BT North America, Inc. uses its own packet switches to provide frame relay service. Munro did not know whether the StrataCom equipment will be used to upgrade that service to support speeds above 64K bit/sec or if the IPX would be used to support a frame relay service elsewhere.

Dick Moley, president of StrataCom, has designs on that business, however. "We'll be competing for that business," he said. "I'm optimistic."

The agreement raises questions about StrataCom's reseller agreements with Motorola Codex and Digital Equipment Corp., both of which sell the IPX internationally. StrataCom also has a reseller agreement with Sprint Data Group.

Moley said the BT agreement could be a boon to the existing reseller arrangements because BT's 3,000 salespeople in the U.K. will "explode the reception of fast packet and its overall market penetration." He acknowledged that the resellers will also run into one another on occasion.

Analysts also questioned BT's level of commitment to the StrataCom equipment, given its existing relationship with Timeplex.

"These kind of deals could just fizzle in a week," said Rick Malone, principal at Vertical Systems Group, a consultancy in Dedham, Mass. "Until you see the deal start to bear fruit, you don't really know how it's going to work out."

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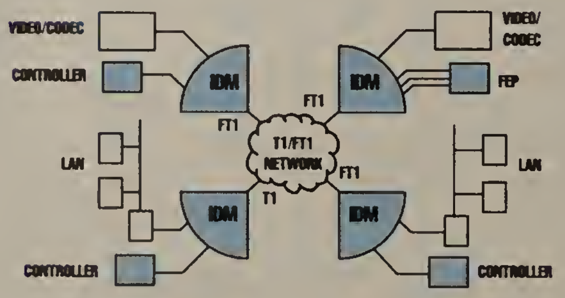

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DCA chief redirects firm back to roots

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What about Advanced Peer-to-Peer Networking (APPN)?

APPN is still very new. It will take some time to see widespread deployment of APPN or, more specifically, end-node or network-node support in user applications. I think it's going to be important for us to address APPN in our products.

What do you see as major challenges for DCA during the next 12 months?

We have to stay current with the continuing changes to Microsoft's operating systems, Novell's NOS or IBM's environment. Changes are taking place at a rapid rate, so one of the things we have to do is anticipate and manage those changes to make them painless for our customers.

The second thing that is going to happen over the next 12 months is a further acceptance of graphical user interfaces in customers' application environments. Not only will this be at the PC level, but we'll also see the use of GUIs in mainframe areas, such as installing front ends to current mainframe applications. So there will be a continued focus on ease of use and GUIs as an important part of overall computing strategies at corporations.

Also, we'll see the increased use of client/server computing at corporations. This is going to evolve over a long period of time. When you talk about mainframe applications, the tremendous investment users have in applications software will dictate how quickly or slowly that evolution takes place. But clearly there are a lot of things that you can do with the investment in PCs and LANs in a client/server model that are very cost-effective outside the mainframe.

What kinds of new products can we expect from DCA during the next year?

We still have a lot of work to do to achieve the goal of providing transparent, cross-platform, heterogeneous solutions for micro-to-mainframe communications needs. By that, I mean users who know how to run Irma on a particular client, such as a Windows client, would also be able to work Irma on any other client, such as a Macintosh or DOS-based workstation. We're rolling out a new version of Irma WorkStation for Windows that supports multiple document interchange. We have DOS 5.0 support in DOS clients for Select [Communications Server], and we have support for NetWare 3.11 in our LAN gateway for token-ring drivers.

We'll have a Windows client for our Select Communications Server and a Presentation Manager version of our Select [Communications Server] products that will be shipping in the future. Also, we have a lot of driver work coming out soon.

Ascend supports inverse mux standard

continued from page 9

these vendors with a strong sales channel, he said.

Helfrich said Ascend's membership in BONDING should help drive progress toward the development of an inverse multiplexer standard.

"We've got the experience in the market that some of the other BONDING members don't have," Helfrich said. "Because of that, I think we have a lot we can contribute to the standards development process. This should speed the effort."

Bernie Schneider, president of SDSAF and director of product management at US Sprint Communications Co., said Ascend's membership in BONDING simplified SDSAF's decision to endorse the BONDING effort, given Ascend's role in SDSAF.

There had been speculation among industry observers that BONDING might be merged into SDSAF, but Schneider said SDSAF would prefer to let other organizations handle the actual standards development process. BONDING members, including US Sprint, have volunteered to provide standards testing.

Other issues discussed at the SDSAF meeting include interoperability of switched services from local exchange carriers and long-haul carriers, as well as interoperability among inverse multiplexers and other network equipment such as videoconferencing systems and routers, Schneider said.

The SDSAF meeting attracted about 150 representatives from more than 30 carriers and customer premises equipment vendors. Although it has not set a specific date, the group is hoping to hold its next meeting this February in Dallas.

Industry Briefs

continued from page 9

The company has not determined how many employees will be let go, the spokesman said. Each organization within AT&T Paradyne will review its staffing needs and make the necessary adjustments.

The restructuring could result in AT&T Paradyne being consolidated into another AT&T business unit, the spokesman said. He also dismissed speculation that AT&T Paradyne may be swallowed up by NCR Corp., the Dayton, Ohio, computer maker that AT&T acquired last summer.

NCR to trim work force. NCR Corp. last week said it will eliminate 120 positions from its St. Paul, Minn.-based Network Products Division by Dec. 8.

The staff reduction is due to redundancies in the product lines of NCR and its parent, AT&T. NCR and AT&T rolled out a networking product line last month at INTEROP 91 Fall comprised predominantly of AT&T StarGroup, Starlan and StarWAN products ("NCR fills out net environment," *NW,* Oct. 14).

Many of the displaced Network Products Division employees were involved in the development and marketing of network hardware such as adapter boards, the spokesman said. Much of that development is now taking place at AT&T's facilities in Lincroft, N.J.

Development of NCR's Comten front-end processors is continuing, the spokesman said. NCR is attempting to redeploy staffers to front-end processor development or other company projects.

Employees without reassignments by Dec. 8 will be laid off, he said. The action will reduce the number of Network Products Division employees to 580.

TELECOMMUNICATIONS

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Worth Noting

In the past three years, carriers have announced plans to install more than 60 new undersea fiber-optic cables, which will be brought on-line by 1997, according to a recent study by Kessler Marketing Intelligence Corp., a Newport, R.I., market research firm.

Carrier Watch

US Sprint Communications Co.'s Sprint Video group last week announced a program designed to assist users in the introduction, implementation and internal promotion of videoconferencing.

The program, dubbed Square One, is designed to build acceptance of videoconferencing with new users and to assist companies that wish to maximize usage of existing videoconferencing systems.

Square One is a turnkey package which provides on-site training, open houses, executive briefings, educational literature, newsletter support, payroll stuffers, posters and brochure covers to promote videoconferencing.

The program covers a 90-day period and sells for $3,000 per site.

AT&T recently announced that it received a two-year contract for long-distance services from International Dairy Queen, Inc., the parent company of American Dairy Queen Corp.

Under the agreement, AT&T will provide long-distance services for pay phones located at each of Dairy Queen's 5,000 locations throughout North America, the Far East and the Middle East. AT&T will also provide 24-hour operator services for calling card, person-to-person, third-party billing and collect calling service from pay phones at participating Dairy Queen stores.

The ISDN equipment market at a glance

Projected sales revenue (in millions of dollars)

Device	1991	1995
PBX	$325.5	$368.3
Video systems	96.7	404.2
Gateways	103.0	171.3
Controllers	74.0	296.1
Fax machines	93.6	374.0
Multiplexers	20.9	33.6
Non-PC terminal adapters	109.1	120.5
PC terminal adapters	64.2	90.3
Digital telephones	20.2	22.1
ISDN workstations	41.7	287.0
Multimedia terminals	NA	368.0
Key telephone systems	1.5	2.3
Front-end processors	18.7	22.6
Other	11.7	28.7
Total	**980.8**	**2589.0**

NA = Not applicable

GRAPHIC BY TERRI MITCHELL

SOURCE: FROST & SULLIVAN, INC., NEW YORK

Debate erupts over need to run fiber to the home

USTA members question policy's appropriateness.

By Anita Taff
Washington Bureau Chief

HONOLULU — Industry experts speaking at the recent U.S. Telephone Association (USTA) conference here vigorously debated whether it will be necessary for the regional Bell holding companies to run fiber-optic cable to user doorsteps in order to support advanced services.

The experts disagreed even more vehemently on how far policymakers should go in attempting to induce the RBHCs to migrate to all-fiber facilities.

The controversy was sparked by a Federal Communications Commission proposal last month to explore the idea of allowing the RBHCs to carry video programming within their respective service areas. RBHC officials and some policymakers contend this would encourage carriers to upgrade their networks to broadband facilities.

Although efforts to install fiber to the doorstep would be driven by residential entertainment services, the upgrade could benefit corporate users by improving service quality and reliability. Furthermore, the need to support large volumes of bandwidth-hungry video might encourage the RBHCs to upgrade their switching systems to technologies such as optical switching.

"Replacing [copper] with fiber optics will be expensive — much too expensive to be carried out without" new revenue sources, said James Johnson, chairman and chief executive officer of GTE Corp. "Our ordinary sources of revenue — voice and data — are growing steadily in volume, but those gains are not of a magnitude to warrant the effort required to assure rapid network modernization."

Cost estimates to run fiber to U.S. households range as high as $600 billion. This raises serious questions about who should shoulder the burden of paying for the upgrade — ratepayers, carrier shareholders, or residential or business users.

Some speakers at USTA said visions of fiber networks may be too grand. "There is a need to upgrade the infrastructure to support video and other services, but there is a question whether it has to be all fiber or a combination," said Byron Marchant, a legal adviser for FCC Commissioner Andrew Barrett and the only adviser with an engineering background.

He suggested that radio-based services such as personal communications network or microwave services could be used to cover the last mile from the RBHC network to users' premises. The success of "video compression over the airwaves makes us think there's more than one way to skin a cat," Marchant said.

William Weiss, chairman and CEO of Ameritech, said his firm is not waiting for policymakers to sort things out. Installation of a full broadband network is ultimately the best solution, but Ameritech is taking intermittent steps to upgrade net facilities.

Fiber is being installed from central offices to points near cus-

(continued on page 13)

FCC forms council to monitor outages

Users are tentatively pleased with commission's effort but question impact of an advisory group.

By Bob Wallace
Senior Editor

SAN ANTONIO, Texas — Speaking at the National Association of Regulatory Utility Commission's annual conference here last week, Federal Communications Commission Chairman Alfred Sikes announced plans to create a special council to work with local and interexchange carriers to minimize service interruptions.

The Telecommunications Reliability Council (TRC), formed after a wave of recent service outages hit the East Coast, will be composed of users, carriers, equipment vendors and state regulators.

The FCC said it would name representatives to the TRC in the coming weeks and allow it to map out its own goals. "Among other things, we expect the council to recommend steps that the industry and regulators can and should take to assure communications system reliability," Sikes said.

Gerry Vaughan, deputy chief of operations for the FCC's Common Carrier Bureau, said the TRC will probably study carriers' network infrastructures, identify areas for improvement and submit reports suggesting corrective action to the commission.

Asked what power the TRC will have, Vaughan said the group would act as an advisory council to the FCC. "The commission would then present the group's findings as a notice of proposed rule making for public comment before taking any action," he said.

Craig Margolis, a legislative aide with the House telecommunications and finance subcommittee, said the council will have the full authority of the FCC in its information gathering activities, "but I think that will be the extent of its mission. The FCC would be the body to act on the collected data."

Users reacted favorably to news of the council's formation but said they needed to know more about the group's composition, its power and mission state-

(continued on page 13)

WASHINGTON UPDATE

BY ELLEN MESSMER

Tariff 15's last stand. AT&T last week defended Tariff 15 before the Federal Communications Commission, arguing that the discounts it has offered to single customers under the tariff are lawful and should not be rejected. In a decision this past August, the FCC found the carrier's Tariff 15 discount for Resort Condominium International, Inc. to be anticompetitive and rejected it. The FCC also suspended the remaining Tariff 15 deals.

Richard Firestone, the FCC Common Carrier Bureau chief, said the FCC is giving AT&T one last chance to argue Tariff 15 as part of due process in completing the investigation, which is being handled in an unusually accelerated manner. Parties opposing Tariff 15 must file this week, and AT&T must file its replies to opposition comments next week.

Firestone said the FCC is eager to conclude the investigation because customers need to know the status of the tariffs as soon as possible.

The commission's final decision will affect the Tariff 15 deals that are still pending for 12 other customers.

AT&T argues that it was compelled to offer special discounts to these customers in light of similar discounted offers from competitors.

"AT&T competitors have routinely made single-customer offerings while Tariff 15 has been in effect — as the commission has repeatedly recognized," AT&T stated in its argument before the FCC last week. "This conduct flatly contradicts any suggestion that Tariff 15 has inhibited or could inhibit price cutting by AT&T or its competitors."

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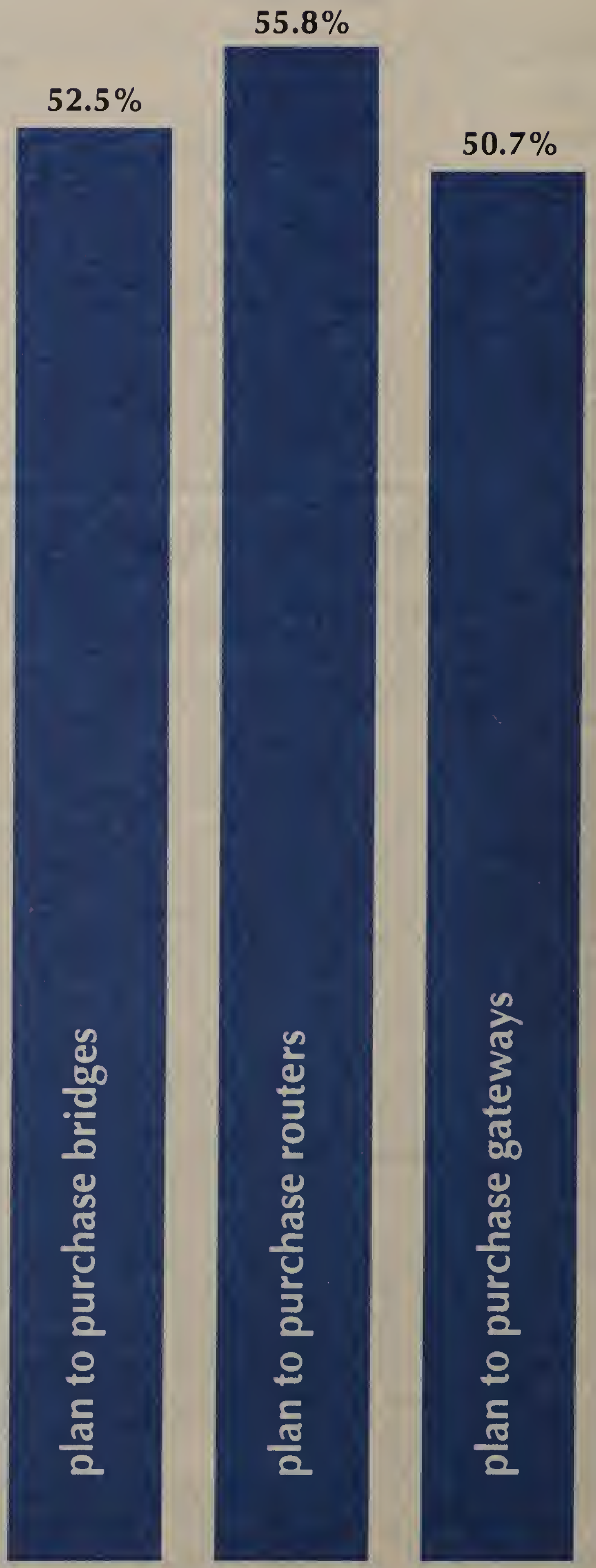

Percentage of network managers surveyed who plan to purchase internetworking products in the next 12 to 18 months and read *Network World*.

Source: The Adams Company Internet Study, 1991

NETWORK WORLD

FCC forms council to monitor outages

continued from page 11

ment before speculating on its chance for success.

"The ICA needs to know the goals of the group and whether it will have the power needed to achieve them," said William Pomeroy, director of telecommunications public policy for the International Communications Association, a user group comprising more than 600 U.S. companies. "The ICA would certainly be interested in serving on any council that would in any way help limit or eliminate outages."

Without that power, the TRC will accomplish little, users said. "It's one thing if the group is listened to by the FCC and the industry," Pomeroy said. "But if this is a case of politics and the group was formed just to pay lip service to the problems carriers are having, it won't work."

Carriers, for one, do not seem to have a lot of faith in the TRC. A spokesman for MCI Communications Corp. said, "We believe the issue of network reliability will not be addressed by the FCC, but rather by the marketplace. Setting standards is nice, but the reality is that customers will police this issue."

AT&T and US Sprint Communications Co. said they would not comment on the TRC and network availability standards until they learned more about the group.

Some users wondered why the TRC was not formed back in 1988 when a fire knocked out Illinois Bell Telephone Co.'s Hinsdale central office switch for several days in what is viewed as one of the earliest major public network disasters.

"It's only been three years since Hinsdale," quipped Don Rees, a vice-president with the First National Bank of Maryland in Baltimore.

Users were split on whether the group should be charged with the tall task of setting service quality standards for carriers.

"I can't think of a better group to set network availability guidelines for local and interexchange carriers," Pomeroy said.

Others agreed. "My management wants me to reduce trouble tickets by a factor of three in 1992 without spending more money for backup or diverse routing," said Stanley Welland, corporate telecommunications director for General Electric Co. "This is the single biggest challenge I've ever faced, and I can't meet it unless I'm working with a group that can force carriers to take steps that reduce the outages."

But the First National Bank of Maryland's Rees said the TRC should focus its efforts on collecting outage data from carriers and leave the setting of service standards to the FCC's Common Carrier Bureau.

"I'd like to see this council act something like the National Transportation Safety Board and collect and analyze outage data," he said. "But I'd also want this council to recommend some type of [punitive] action to the FCC."

Rees said an easily accessible central repository of timely outage information would be a valuable resource for users.

"On-line access to a database [containing] outage information for the last year would be a godsend," Rees said, adding that he would like to see carriers submit reports to the TRC after a service interruption.

Welland would also want carriers to submit reports explaining whether things such as proposed layoffs or restructurings might affect network availability.

"There will always be fiber cuts," Welland said. "But what disturbs me the most with AT&T's outages is that they seemed to be caused or worsened by internal processes that its engineers and technicians use to maintain and manage the network." ◘

Ellen Messmer contributed to this story.

Debate over running fiber to homes

continued from page 11

tomer premises, and copper feeds are then run to the individual locations. "Copper, after all, can carry a great deal of bandwidth for a few feet," Weiss said.

Ameritech is also concentrating on building intelligence into the net and investing in new signaling technology such as Common Channel Signaling System 7, he said. Other RBHCs may have to adopt Ameritech's approach because it is unclear whether policymakers will consent to having the RBHCs carry video programming.

When the FCC voted to explore the video programming issue last month, four of the five commissioners issued statements that addressed their reservations about allowing RBHCs to provide programming.

"Those expressions by the four [commissioners] said something about how many unanswered questions there are, how many inponderables there are about this whole business," FCC Commissioner Ervin Duggan told USTA attendees.

Duggan said he is concerned about how far regulators should go in molding the network of the future. He and several other commissioners said they feared that the proceeding was artificially trying to steer the industry toward fiber facilities.

Some also predict that rather than starting their own video operations, RBHCs will purchase existing cable TV operations and, as a result, control all transmission media going into U.S. homes. "We raise at least the specter here of one wire into the home, which I likened in my statement to one printing press," Duggan said. ◘

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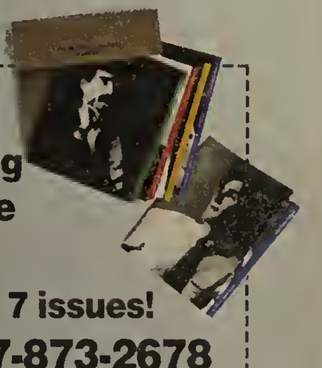

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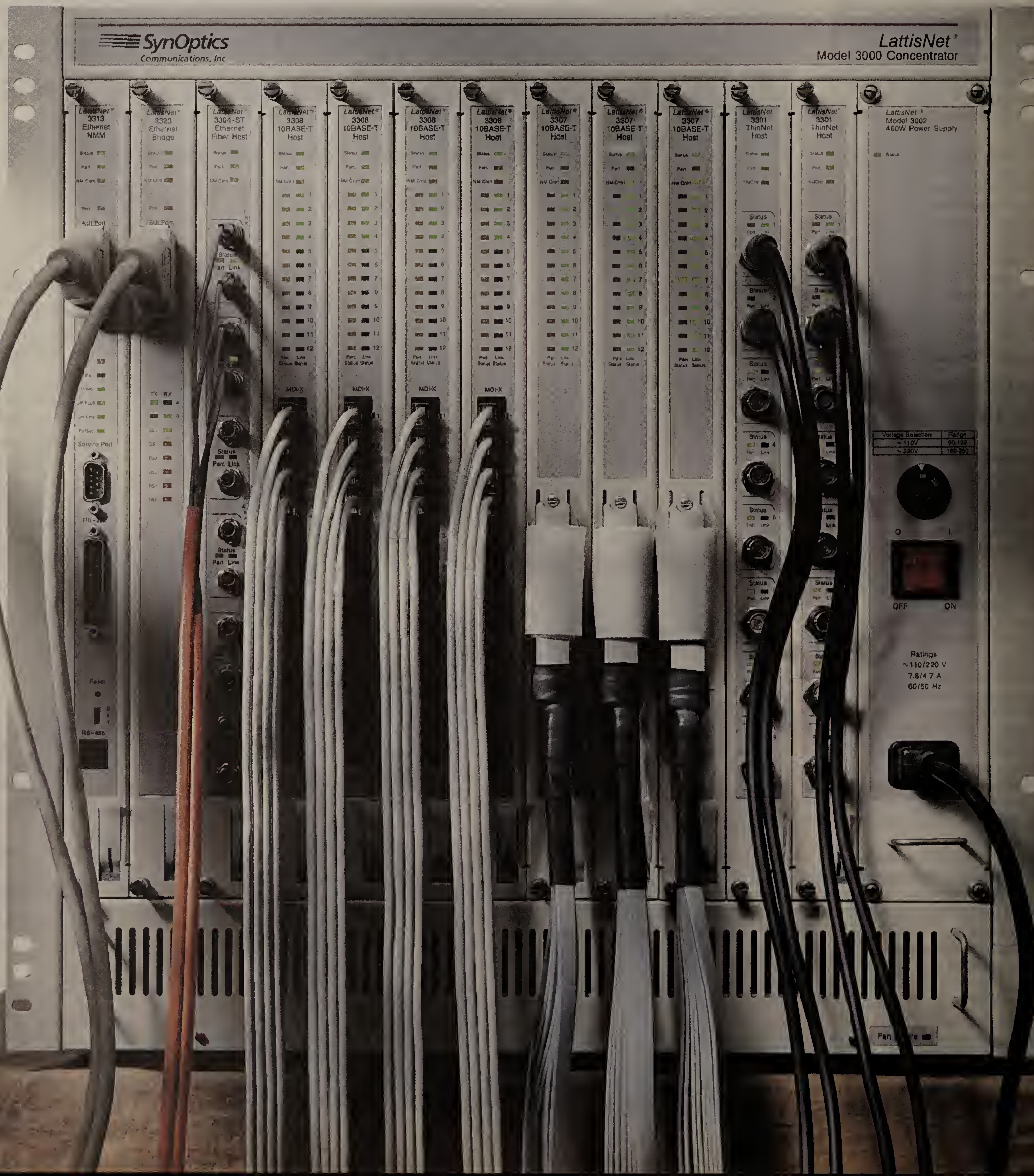
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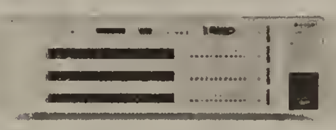

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PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

Harris Adacom Corp. of Dallas last week announced that its Challenger ES/174 Extended System controller has become the first IBM 3174-compatible controller to be certified by the National Institute of Standards and Technology as compatible with the Government Open Systems Interconnection Profile.

Data Packets

Racal-Datacom, Inc. last week said it has joined the Frame Relay Forum to support the development of customer-driven technologies.

The Frame Relay Forum is a group of service providers, equipment vendors and users looking to further the implementation of frame relay products and services.

Racal-Datacom recently introduced a frame relay module for its Omnimux T-1 multiplexers.

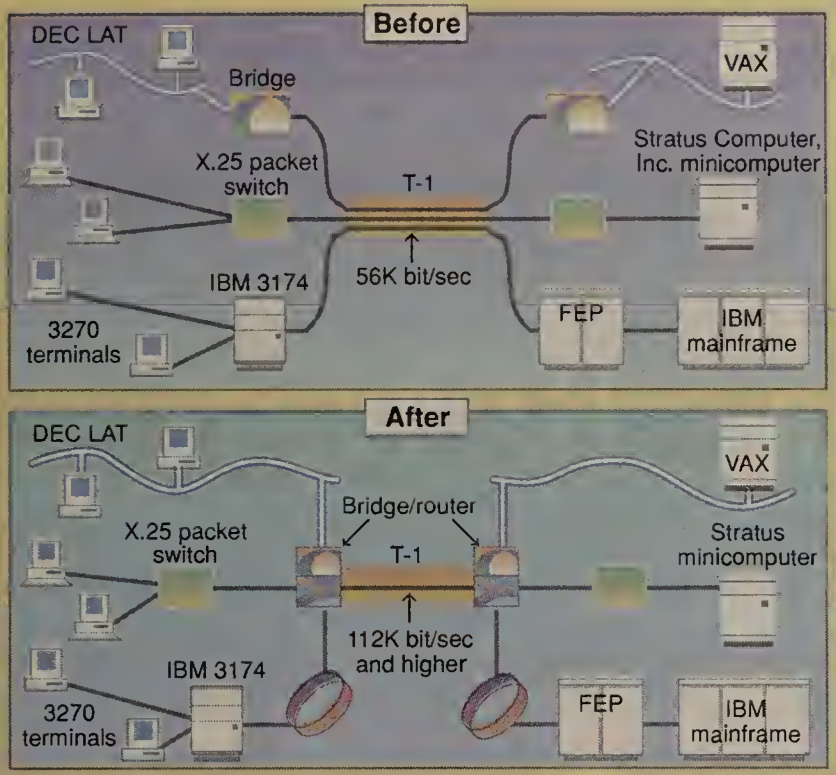
Separately, the company said it won a $1.7 million contract to outfit Posten, the Swedish post office, with a 9.6K bit/sec modem net connecting 800 postal branches to a funds transfer network.

Candle Corp. recently announced an agreement with **IBM** to develop IBM SystemView-compliant systems management products for IBM's Application System/400 minicomputers.

The products will support automation of management tasks and performance monitoring. They will be targeted at users with multiple networked AS/400s and AS/400s linked to mainframes.

The new AS/400 products will work with Candle's Omegacenter for MVS mainframe systems management line. ▣

Goldman, Sachs gets its net together



Goldman, Sachs is creating better bandwidth utilization and simplifying its network configuration by merging 3 logically separate nets onto 1 multiprotocol backbone.

FEP = Front-end processor
LAT = Local Area Transport

GRAPHIC BY SUSAN SLATER

SOURCE: GOLDMAN, SACHS & CO., NEW YORK

Five vendors team up to build E-mail directory spec

Seen as workable approach until X.500 evolves.

By Ellen Messmer
Washington Correspondent

NEW ORLEANS — Five vendors recently unveiled plans to create and implement a jointly developed specification that will enable users to exchange electronic mail directory data via X.400 between incompatible systems.

At the recent Electronic Mail Association conference here, Digital Equipment Corp., Pacific Bell, Retix, Soft-Switch, Inc. and Sprint International said they will team to produce Directory Exchange (DX), which they view as an interim step to X.500, the Open Systems Interconnection Directory Services standard.

When implemented in E-mail products, DX will provide a common way for E-mail directories to exchange directory information for automated updating.

"It gives me a good feeling [that the vendors] understand the problem,' said Steve York, manager of information exchange technologies at Hughes Aircraft Co. He added that DX is a workable approach as a bridge to X.500.

As users struggle to integrate proprietary E-mail systems through X.400, they are finding that their multiple brands of E-mail have incompatible directories that inhibit information exchange, according to Greg Loux, director of advanced products at Soft-Switch.

"Each E-mail system has a completely different form of directory access," Loux said.

Soft-Switch, which already offers its own line of directory synchronization software to support proprietary E-mail systems, is aiding the effort for a common DX format so users will be encouraged to migrate to X.400.

"All directory synchronization is an interim step until X.500," Loux said.

David Knight, director of market development at Retix, agreed that DX is an interim solution to solve the directory synchronization problem for large users moving to X.400.

"We want to see customers install more store-and-forward technology so they have an E-mail backbone," Knight said. "X.400 is the only format to do that."

Retix has assumed the role of central coordinator in the DX effort. Knight said the Retix engineers have discovered that the 12 formats they are reviewing have a high percentage of common features for performing the synchronization process.

"The crossover is incredibly high — about 80%," Knight said. But he also noted that the DX specification will not represent the lowest common denominator.

The vendors plan to release the DX specification by the end of the year. ▣

Firm to meld three backbones into one

Goldman, Sachs redesigning network, migrating to distributed environment, single backbone.

By Paul Desmond
Senior Editor

NEW YORK — Goldman, Sachs & Co. is in the midst of a network redesign that will enable the firm to migrate to a single logical backbone and adopt a net architecture that will support its move to distributed applications.

The company is migrating to a distributed application environment in order to give business units more freedom in developing applications to meet their specific market needs, as opposed to relying on multipurpose host-based applications.

Coupled with that effort is a network redesign that will result in the migration of three logical networks — a Systems Network Architecture net, an X.25 net and a bridged Ethernet internet — onto a single logical multiprotocol backbone.

That backbone, based on Wellfleet Communications, Inc. bridge/routers, will support communications between Goldman, Sachs offices worldwide while simultaneously supporting access to existing centralized applications here that will continue to be used for some time.

"Goldman [Sachs] is moving toward a distributed, decentralized, client/server application environment," explained John Magee, vice-president at Goldman, Sachs, based here. "We're providing a migration path for new applications at very little incremental cost over our existing infrastructure."

Today, Goldman, Sachs' network is largely centralized, with most users employing applications that run on mainframes and minicomputers in two New York data centers.

But the company is putting an emphasis on developing product-specific applications that will run on machines at offices in 11 U.S. cities and six cities abroad. That promises to enable each of the firm's business units to tailor applications to the needs of its clients, traders and salespeople, as opposed to supporting all its products through a single, multi-

(continued on page 18)

Isicad Command interface provides link to OpenView

By Jim Duffy
Senior Editor

ANAHEIM, Calif. — Isicad, Inc. plans to ship in the first quarter of next year a link between its physical network management system and Hewlett-Packard Co.'s OpenView.

The software interface is intended to merge Isicad's Command package with OpenView, providing users with physical and logical management of network-related problems.

For example, a communications manager alerted to a node failure by HP OpenView can also view schematics, connections and administrative information about that node from Isicad's Command system.

The manager can locate the node and determine its active ports, circuits and the cabling configuration by opening a window into the Command system on the OpenView screen, according to Isicad.

Command is used for network design and layout as well as change management. It documents the physical infrastructure of the network, including all net components, cabling routes and connections.

Unlike logical management systems such as HP's OpenView, Command stores more detailed information about intelligent, manageable network elements and nonmanageable network devices, such as cables, patch panels and punchdown blocks.

Command also produces work orders for carrying out change management functions, such as reconfiguring connections between nodes.

The software interface gathers information about the faulty node from the OpenView database and passes it to the Command database, said John Kaiser, Isicad's product marketing manager. The Command system then pinpoints the location of the node and details its physical configuration.

Once the faulty node is located

(continued on page 18)

Firm to meld three backbones

continued from page 17

purpose application, Magee said.

The router network will simplify the wide-area communications needed among offices.

Goldman, Sachs currently has three logical networks, all supported over a single T-1 backbone based on Network Equipment Technologies, Inc. (NET) T-1 multiplexers.

First is a bridged Ethernet LAN internetwork that supports terminal access to Digital Equipment Corp. VAX hosts using DEC's Local Area Transport (LAT) protocol. An X.25 network primarily supports access from personal computers and LAN-attached gateways to a Stratus Computer, Inc. minicomputer for trading applications.

Both typically use 56K bit/sec channels on the T-1 backbone.

The company also has an SNA network with mainframes in New York and remote front-end processors in London and Tokyo. Cluster controllers at other sites are supported on multidrop lines, typically six controllers for every 56K bit/sec line. That configuration provides a response time of less than one second for the domestic portion, according to Magee.

"I don't see any problem in maintaining that" with the router network, he said.

Goldman, Sachs plans to first migrate its DEC LAT traffic to the Wellfleet router network, followed by SNA, which will be supported by outfitting the cluster controllers with token-ring adapters so they can be attached to token-ring local-area networks. The token ring is then attached to the Wellfleet routers and uses source route bridging to connect to the mainframes.

To link its X.25 packet switches to the Wellfleet routers, the company will employ Wellfleet's pass-through feature, Magee said. Pass-through allows X.25 High-Level Data Link Control data to be encapsulated in Internet Protocol packets for transmission across a multiprotocol backbone.

Today, the multiprotocol backbone links Frankfurt, Germany, London, New York, Toronto and, soon, Tokyo.

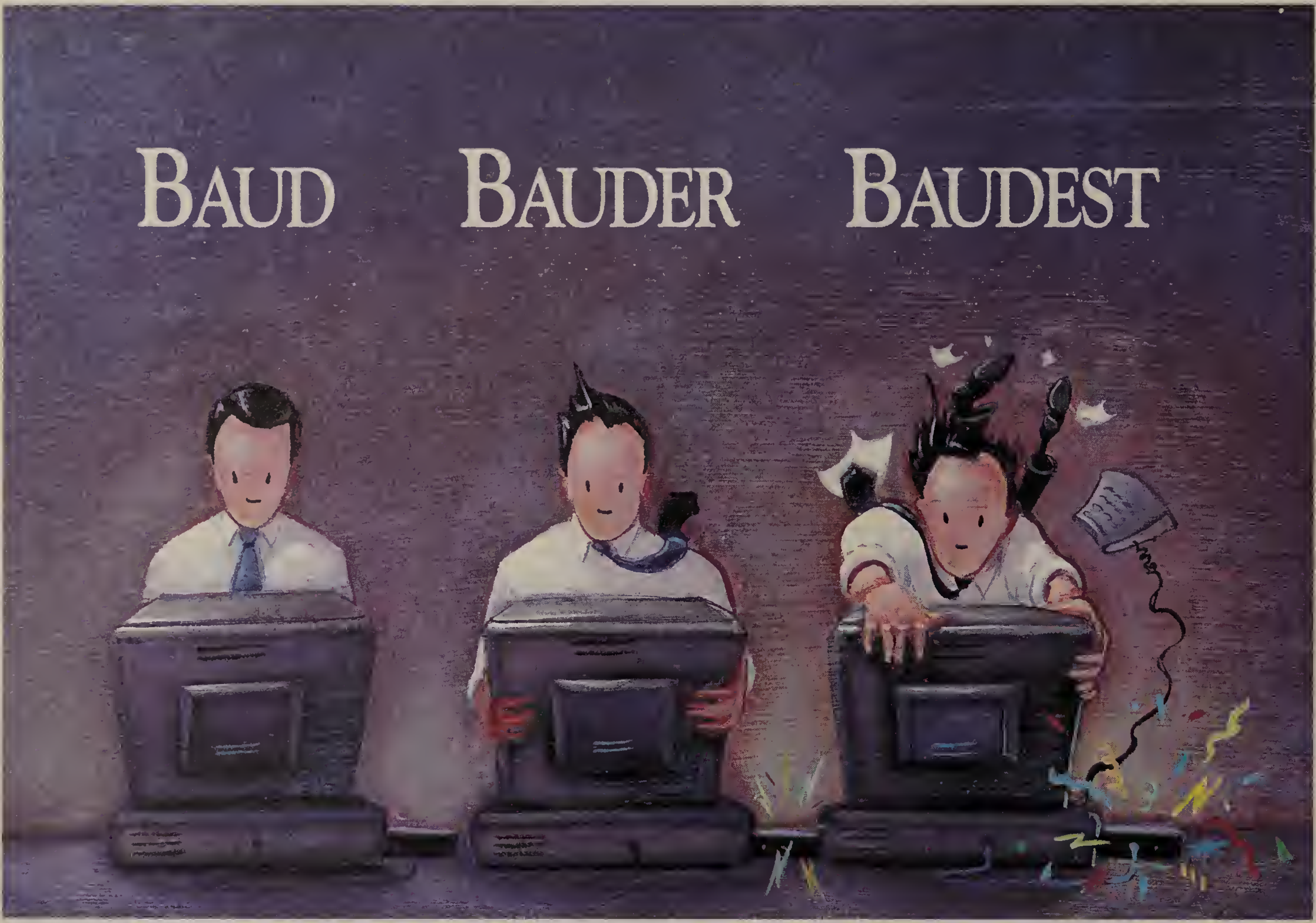
"We expect by the middle of next year to have it in all our offices," Magee said.

Besides providing better bandwidth utilization by letting all three networks share the same bandwidth pool, the router net will simplify some network configuration issues.

For example, the company currently uses IBM's host-based NetView network management system, along with its NET multiplexers, to automatically switch data circuits from one data center to the other in case of a failure.

"That is a fairly complex process to maintain and test," Magee said.

When the SNA network is migrated to token-ring LANs, the source routing algorithm will automatically find a new path in the event a primary route is disabled, Magee explained.



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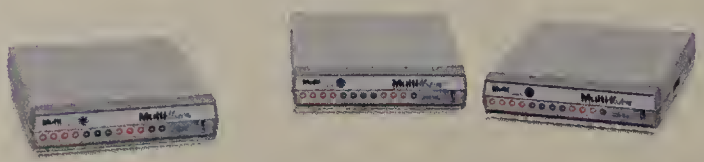

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Isicad Command provides link

continued from page 17

and identified, OpenView is responsible for problem resolution, Kaiser said.

"We don't go out to the network devices themselves," Kaiser said. "We go through OpenView."

The communication between Command and OpenView is unidirectional; Command receives information from the OpenView database. Isicad, however, is mulling over a bidirectional link to OpenView that will allow the HP management system to store information on the physical attributes of a node, Kaiser said.

The OpenView connection will be the first link between Command and a higher level logical management system, but it will not be the last. Isicad is evaluating software interfaces to systems from Cabletron Systems, Inc., IBM, Sun Microsystems, Inc. and others, Kaiser said.

The software module, which was developed by Isicad with assistance from HP, will be priced at $2,500. It will be sold by both companies.

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

The market for local-area network internetworking devices — bridges, routers and hubs — is growing at 40% annually, according to Aberdeen Group, Inc., a research and consulting company in Boston.

Netnotes

Fibronics International, Inc. recently introduced a Fiber Distributed Data Interface concentrator that supports as many as 48 10Base-T Ethernet ports. According to the company, based in Hyannis, Mass., the FX8610 Workstation Server reduces the cost of direct FDDI connection while providing improved net performance.

Besides providing links to FDDI backbones, the FX8610 lets locally attached workstations communicate at Ethernet speeds of 10M bit/sec.

The server is available now and costs between $19,000 and $29,000, depending on configuration.

Allied Telesis, Inc. (ATI) of Mountain View, Calif., has begun shipping what it claims are the industry's first 10Base-T multiport repeaters with embedded transceivers that make it possible to tie the twisted-pair devices to thick or thin coaxial cable Ethernet backbones.

The four-port AT-MR460T and eight-port AT-MR860T repeaters enable net administrators to use unshielded twisted pair to connect work groups directly to a coaxial-based Ethernet.

"By installing the new ATI products, you can run up to eight fully repeated network nodes from a single tap, and each node can be as far as 100 meters from the tap," said Anders Swahn, ATI product marketing director. That compares to the 50-meter restriction of attachment unit interface cable drops.

The products are available now and cost $795 and $895, respectively. ▣

Network General offers Sniffer on new platforms

Protocol analyzers will address high and low end.

By Caryn Gillooly
Senior Editor

MENLO PARK, Calif. — Network General Corp. last week announced three new platforms for its Sniffer network analyzer that extend the product's capabilities to both lower and higher end users.

While the existing Sniffer was available as a product for the IBM Personal System/2 Model P70, Compaq Computer Corp. 386/20 and Toshiba Corp. 3200SX portable computers, the new versions include those models, as well as the Series 200, based on a preconfigured NCR Corp. 80386SX-based microcomputer; the Series 550, a software/board package for the new Compaq 80486-based portable; and the Series 310, a color version of the existing Series 300 for 80386SX-based Toshiba 3200SXC portables.

"The [products] provide new options for customers that want to run the Sniffer software on different platforms," said Harry Saal, president of Network General, based here. The new Sniffer products offer the same functionality as the existing ones.

According to Saal, the Series 200 is geared toward lower end users that have a single network and do not require the mobility of portable analyzers.

Until now, users have had to pay extra for the Sniffer's portability. The price for the lowest end model starts at $16,750, and the Series 200 costs $14,000.

"We found that a number of customers did not need all that flexibility," Saal said. "The Series 200 desktop offers the Sniffer network analysis solution without paying the premium for portability."

One of the reasons the Sniffer was originally designed for portables is that it can only monitor one network segment at a time. This is why the desktop model is geared toward smaller sites with a single network topology.

However, according to Saal, customers that use local-area network hubs can monitor multiple net segments by simply moving cables by hand from one segment to another, rather than spending the additional money on a machine that can be moved.

On the high end, Network General introduced the Series 550, a version of the product for the new 33-MHz, 80486-based Compaq Portable 486c color ma-

(continued on page 22)

New version of DCA 3270 pack shown

By Joanne Cummings
Staff Writer

BOSTON — Digital Communications Associates, Inc. last week unveiled a version of its Microsoft Corp. Windows-based 3270-emulation software that offers several new features in addition to easing configuration and installation.

Like the previous version, the new Irma WorkStation for Windows Version 1.1.0 runs on local-area network-attached personal computers and enables them to communicate with IBM hosts through an Irmalan network gateway. The software can also be used with direct mainframe connections.

Version 1.1.0 has an autosensing feature that can determine the network interface in the personal computer and automatically adjust installation and configuration options accordingly.

This capability obviates the need for users to open their computers and check hardware settings, thereby speeding the installation process significantly, according to Gerald Buran, DCA's vice-president of sales and marketing.

Another configuration enhancement allows users to designate themselves as beginners or advanced users. The beginner level minimizes the number of options a user must select, while the advanced level offers more options so users can optimize their use of the product.

The new version also offers a Multiple Document Interface, which allows users to more effectively manage as many as five mainframe sessions. A user can control all five sessions from the same menu, as well as resize and reposition the session windows within the main screen.

The software also supports Network Basic I/O System networks, enabling NETBIOS clients to communicate with IBM hosts through the company's Irmalan gateway. Buran said DCA will support Novell, Inc.'s Internet-

(continued on page 22)

"Our best customers for work flow are those who have tried to use electronic mail in running a business and see that E-mail today is totally unmanaged and unstructured."

▲▲▲

Anand Jagannathan
President and founder
Reach Software Corp.

Reach founder looks at work flow concept

Jagannathan sees new product class as best way to organize, route information within a company.

Q&A Today, Reach Software Corp. is introducing WorkMAN, LAN-based work flow software designed to automate the way in which information is organized, routed and processed in a company.

WorkMAN includes development tools and a run-time environment to support client/server applications that manage the processing of business tasks, as well as the flow of information and forms across an enterprisewide net. Reach built its WorkMAN platform to take advantage of local-area network-based electronic mail systems as a transport mechanism.

Anand Jagannathan, president and founder of Reach, recently spoke with *Network World* Editor John Gallant and West Coast Bureau Chief Timothy O'Brien to discuss the emerging concept of work flow applications and the network issues involved in supporting distributed applications.

Before founding Reach, Jagannathan was an architect of Banyan Systems, Inc.'s VINES network operating system and a senior systems architect at Data General Corp.

He began his career at AT&T Bell Laboratories, where he was one of the principal designers of the WE3200, AT&T's 32-bit Unix microprocessor for which he received a patent.

Jagannathan received a doctorate and a master's degree in computer science from Rice University in Houston and a bachelor's in electrical engineering from the Indian Institute of Technology in Kanpur, India.

What is the concept of work flow, and how has it developed?

What we are seeing in the market are two parallel trends in terms of applications deployed on networks. One is downsizing existing applications from a mainframe or minicomputer, and that's where database servers are used on the network. The other is among customers that have already cost-justified large networks and are now looking at new and different ways of using them.

Moving database applications from mainframes or minicomputers to LANs is easy to understand because the task is already automated. We are looking at automating business processes that haven't been automated before. These are the areas such as expense reports or request forms that most companies still do using paper.

E-mail is a classic example. Companies are realizing they send a lot of important business information through E-mail. Although we are worried about management and security of data when it is stored, we don't have these same controls over data that is moved. In fact, we have no idea whether messages are being received or even followed up by someone.

Users are saying they want better ways of managing data that is being moved and they want to better utilize their networks. Today, when people build applications, they use a database, which provides a much richer development environment than just using flat files.

In the same way, we're saying E-mail is a simple way to move information.

But E-mail is just the tip of the iceberg. Sending more complex information, such as a project report or a purchase order, is a

(continued on page 22)

Why be content to run when you

*OS/2 2.0 is scheduled to be released in March 1992. IBM DOS to OS/2 1.3 upgrade offer is good through 12/31/91 **In Canada call 1 800 465-1234. IBM and OS/2 are registered trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. © 1991 IBM Corp

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New version of DCA 3270 shown

continued from page 19

work Packet Exchange (IPX) networks in the future but declined to say when.

Irma WorkStation for Windows 1.1.0 is available now and is priced at $495. Customers that bought the previous version from Sept. 1 through Dec. 31 can upgrade to the new version free of charge. Users who bought the software before Sept. 1 can upgrade for $95.

The company is also offering users of other gateway products the ability to trade in the competing software and buy Irma WorkStation for Windows 1.1.0 for $125.

For additional information, contact DCA at 1000 Alderman Drive, Alpharetta, Ga. 30202, or call (404) 442-4521. ☑

Sniffer offered on new platforms

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chine introduced last month.

The portable has an Extended Industry Standard Architecture bus and will be able to support Ethernet and token-ring environments, as well as dual-topology options and Network General's Fiber Distributed Data Interface monitoring capabilities when they become available. Saal said the firm demonstrated FDDI monitoring and analysis capabilities at INTEROP 91 Fall and NetWorld 91 Boston but was not ready to comment on availability.

"This is geared toward customers that need higher performance and maybe intend to move to FDDI," Saal said. "This high-end product is designed to provide 486 and FDDI support."

Finally, the Series 310 is software for the color version of the Toshiba 3200SXC portable. It supports Ethernet, token-ring and wide-area net environments as well as dual-topology options.

The Series 200 is available now, fully configured, for $14,000. The Series 550 is expected to be available in the first quarter of 1992 at a price of $12,500 for the software/board package. Users have to purchase the Compaq portable separately.

The Series 310 is available now. It costs $12,500 for the software/board package and $20,750 for the fully configured Toshiba portable. ☑

Reach founder looks at work flow

continued from page 19

different level of moving information. The concept of work flow on top of E-mail is the same idea as a database sitting on top of a simple file system.

How is work flow automation different than groupware?

Groupware is a catchall for everything. A database manages the sharing of information; groupware allows the sharing of information. But work flow manages the flow of information across a network.

Groupware provides a way for people to share information, whether it's simple office programs or something like Lotus [Development Corp.'s] Notes, which provides conferencing. Work flow is different because it is a way to move, track and organize information as it moves through the network.

What are the key capabilities of work flow?

First, it lets you sort messages so you can organize information. For example, if you get 30 purchase order requests, you can say, show me the ones over $10,000 because I want to sign those first.

It's also a way to route information. For instance, if you develop a purchase order, it automatically knows that you initiated the purchase order and it should be sent to your manager.

The third is the processing of the information and can include the integration of an application such as a database. Many companies are doing studies of work flow, and products are going to start coming out [now] and early 1992. People who are deploying networks need to be aware of what's happening with work flow because it is going to be one of the key applications for networks in the '90s.

Are there other companies addressing this?

The first companies to address work flow were the minicomputer companies, but they lost their market positions to personal computers and networks. They realized that they may be able to reposition their office automation systems as work flow systems and get these customers back.

Unfortunately, they did the standard minicomputer thing — they tried to sell the whole minicomputer system and everything else, as opposed to orienting the software toward a network.

The companies that are going to be successful are the LAN-oriented companies. Both Microsoft [Corp.] and Borland [International, Inc.] see this area of network applications [as] strategic to them. They all talk about work flow, and they all are looking at work flow technologies. But it is very difficult for the application companies to be successful in selling network applications because it requires a different perspective and a strong network background.

One reason Notes is reasonably successful is that Lotus didn't develop it — the company used an outside group to do it. We have people who know networks and databases developing work flow, and that is what's required.

How are you addressing work flow from a product standpoint? What are the pieces you are putting into place?

In our product, we use the concept of intelligent forms as a paradigm for dealing with work

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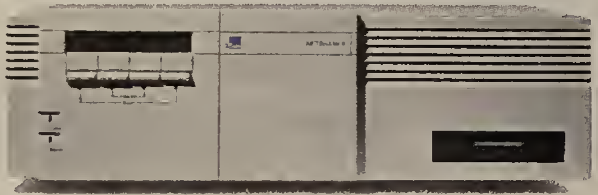

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flow. We provide a Windows-based graphical user interface as a front end to the leading E-mail systems, which are used as a forms-routing mechanism over the network.

What does providing these work flow capabilities mean in terms of network design? Does it put a much larger strain on the network?

No, it means that the networking architecture now has to be more modular. All the major networking companies are suddenly realizing that they have [to get involved] in the network services business. They are going to have to support client applications, which are going to interface with these network servers or services.

Everyone thinks that with client/server, both the client and server should be supplied by the same company. That's not what is going to happen. The network operating system vendors or a database company will provide the server. The application companies will provide the client.

We've already seen this happen in the database market. It's happening with E-mail. Companies are going to have to make a decision to focus on the back end or the front end. Companies with E-mail servers, such as Novell [Inc.] or Banyan, are now offering connections so that other companies can develop front ends. If you are a proprietary E-mail system, you won't fit into a server vendor's strategy anymore.

What does that mean for your company? Aren't the big network players, the people who will decide to play on the server side, going to be evolving toward these work flow automation capabilities?

No, because they want to just provide the transport. From the network vendor's point of view, there is more traffic on the network and more users on the network with these applications. All the networking companies love us because we are building strategic applications for the network.

Who do you see as the powerful emerging competition in the work flow area?

I think Lotus is going to be competing for mind share. We always run into them, even though Notes is not a work flow system. To customers, everything is groupware. People think there is only one groupware product, although there are clear-cut categories of groupware: database, office applications, conferencing and work flow.

How about the strong players in the E-mail server market? Will it be the same companies you mentioned for work flow?

No, I think it will be the networking companies. They are all going to provide their own E-mail server [as will] Lotus with cc:Mail. We are going to support both Microsoft's [Mail Application Program Interface] and Lotus' [Open Messaging Interface]. We hope the MAPI standard will extend beyond just Microsoft to provide access to other E-mail systems, such as DEC's All-In-1 and others.

What is the time frame for this work flow market to develop?

We will see pioneering products by the end of the year. We're already there with our announcement [of WorkMAN]. You'll see real market penetration begin in 1992 and take off in 1993.

Since there is so much hype surrounding client/server, some users are skeptical. Is that true for work flow?

Client/server is a methodology; it's not a technology or a product. It's a way to do things. Using client/server with databases has been pretty successful. Work flow, on the other hand, is not a methodology; it's actually a product class, [similar to] databases. With work flow, E-mail-enabled applications are the methodology and the underlying technology, but that's not what should be propagated to the world. That's how client/server got into a problem.

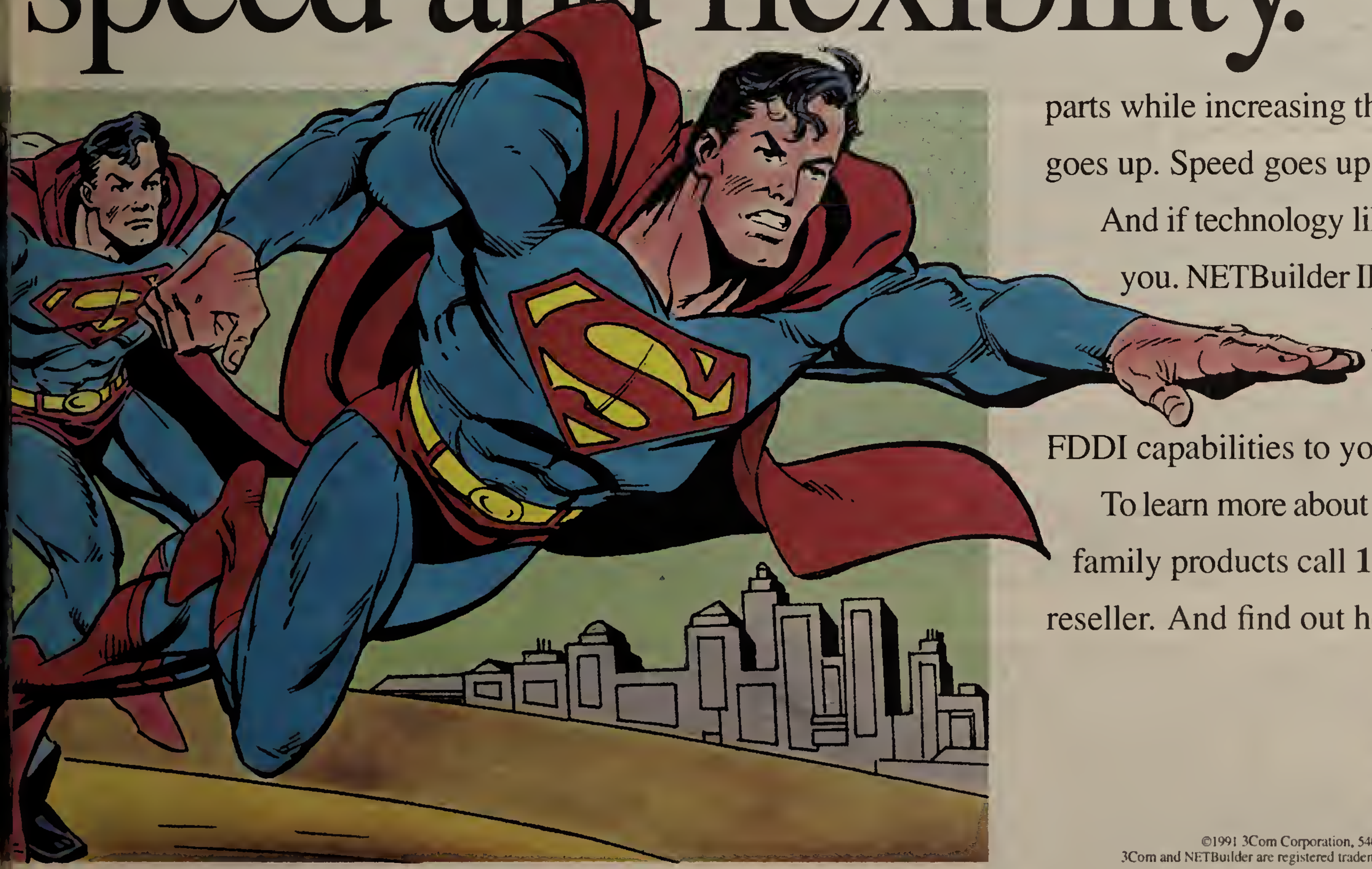
What are the technical roadblocks to realization of this work flow automation vision?

We need more network connectivity. That means more enterprisewide networks. Another area is the seamless linking of Windows. The first versions of Windows had a lot of problems with both networks and database servers. The third is the availability of production E-mail servers. It's one thing to build an E-mail solution for 20 users, but it takes a lot more for 20,000 users on a network.

There are several requirements for enterprisewide networks. One of them is openness. That means open standards, not just on the protocol level. I should be able to have an enterprisewide network that includes Novell, Banyan and Microsoft environments. The second is naming, which is a way to manage the entire network. And third is network management.

There are a lot of strides being made in network management now. The funny thing is that the companies who are addressing it best are the guys who provide the plumbing, such as SynOptics [Communications, Inc.], Cabletron [Systems, Inc.] and all those vendors. But the naming will have to be done by the net operating system companies.

Everyone expects Novell to have a naming system by next year, but that will only be the first version. As Banyan knows, you can have your first level of naming out there, but it takes a lot of time to get it to the point where it is a seamless naming system. X.500 is not the solution. X.500 will be like X.400, a way to connect two different systems. It will be a way to connect one naming system with another naming system. You will be able to exchange naming information, but I don't think it's the solution. ▣



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CONFERENCE UPDATE

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Special events at ComNet '92

1. Keynote Address: *"National Information Infrastructure: Now is the Time!"* presented by **George Heilmeier,** President, Bell Communications Research, Wed., Jan. 29, 9:30 am-10:30 am **FREE to all attendees**

2. Keynote Presentation: *"Frame Relay and SMDS: New Standards for LAN Interconnection,"* chaired by **John M. McQuillan,** President, McQuillan Consulting, with **George Wayne,** President, SMDS Interest Group and **Tom Jones,** President, Frame Relay Forum, Thur., Jan. 30, 9:30 am-10:30 am **FREE to all attendees**

3. Plenary Session: *"Europe 1992: Nations and Networks,"* featuring **Dr. Herbert Ungerer,** Division Head, Directorate General for Telecommunications, Commission of European Communities, Thur., Jan. 30, 2:15 pm-3:30 pm (Part I) and 3:45 pm-5:00 pm (Part II) **Open to Conference registrants only**

4. Annual ComNet Town Meeting: *"The Local Exchange: The New Competitive Frontier?"* moderated by **Richard E. Wiley,** Senior Partner, Wiley, Rein & Fielding, Wed., Jan. 29, 2:15 pm-4:00 pm **Open to Conference registrants only**

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Two-Day Tutorials

Monday, January 27 and
Tuesday, January 28
9:00 am-5:00 pm

T-A
The New Network Design Paradigm
Instructor: **Gary Audin,** President, Delphi, Inc.

T-B
Internetworking Design and Troubleshooting
Instructor: **Mark Miller, P.E.,** President, DigiNet Corp.

T-C
Network Management
Instructor: **Kornel Terplan, Ph.D.,** President, Performance Navigation, Inc.

T-D
The TCP/IP Protocol Suite
Instructor: **Eugene Pinsky, Ph.D.,** Computer Science Dept., Boston University

T-E
FDDI (Fiber Distributed Data Interface): Concepts & Facilities
Instructor: **Wayne Ward,** President, Technology Symposium, Inc.

One-Day Tutorials

Monday, January 27
9:00 am-5:00 pm

T1.1
Broadband Internetworking: Part I
Instructor: **John McQuillan, Ph.D.,** President, McQuillan Consulting

T1.3
Application Planning for Cooperative Processing with Advanced IBM and Multi-Vendor Architectures
Instructor: **Atul Kapoor,** Vice President, Kaptronix, Inc.

T1.4
Using Object Technology in Networked Systems Development
Instructor: **John Rymer,** Vice President, Patricia Seybold's Office Computing Group, and Editor-in-Chief, *The Network Monitor*

T1.5
Desktop Visual Communication in the 90s: Applications, Standards, Silicon and Networks
Instructor: **Richard Baker, Ph.D.,** Research Director, PictureTel Corp.

T1.6
Design and Operation of T1 and T3 Networks
Instructor: **Steven Taylor,** President, Distributed Networking Association and Technical Editor, *Networking Management* Magazine

T1.7
Introduction to Telecom Networking
Instructor: **Lillian Goleniewski,** President, The LIDO Organization

T1.8
Wireless LAN
Instructor: **Kaveh Pahlavan, Ph.D.,** Professor and Director of the Center for Wireless Information Network Studies, Worcester Polytechnic Institute

Tuesday, January 28
9:00 am-5:00 pm

T2.1
Broadband Internetworking: Part II
Instructor: **Tom L. Nolle,** President, CIMI Corporation

T2.2
Network Servers and Operating Systems
Instructor: **J. Scott Haugdahl,** Senior Technical Consultant, Architecture Technology Corporation

T2.3
Application Connectivity Planning and Design for IBM Token-Ring Networks
Instructor: **Doug O'Hearen,** Vice President of Technical Staff, Kaptronix Inc.

SESSIONS SCHEDULE-AT-A-GLANCE

		PUBLIC NETWORKING					INTERNETWORKING	NETWORK COMPUTING		
	Track / Time	1 – Rebuilding the Public Network	2 – Making Sense of Policy and Regulations	3 – Issues and Trends in Network Operations and Management	4 – Planning and Designing Global Networks	5 – Advanced Networks	6 – Building the Enterprise Internet	7 – Getting Started in Cooperative Processing	8 – LAN Architecture and Design	9 – Managing and Optimizing LANs
WEDNESDAY, JANUARY 29	8:00 am - 9:15 am	Status Report on Digital Upgrade and Conversion of the Telephone Company Infrastructure		Integrated Network Management Systems: Product Update and Analysis		Please Explain Wireless Networks	FDDI Update	Please Explain Client-Server Environments	Broadband Internetworking	
	9:30 am - 10:30 am	**Keynote Address: "National Information Infrastructure: Now is the Time" George H. Heilmeier, Ph.D., President and CEO, Bell Communications Research, Inc.**								
	10:45 am - 12:00 pm	National ISDN: What's Ahead?	Washington Scene	Outsourcing the Network: Opportunities and Pitfalls	Will Global Standards Ever Be Truly Global?	Personal Communications Via Low Earth Orbit Satellites	High Performance Multi-Protocol Routers	SNMP: Making the Standard Work in Today's Heterogeneous Networks	Wireless Token-Ring LAN: An Alternative for Growth	Evaluation of LAN Network Management: Strategies and Concepts
	12:45 pm - 2:00 pm	Market Analysis of Fiber Based High Bandwidth Telephone Company Offerings	Wireless Networks: Policy and Regulation	The Integrated Network Management Experience: Panel of Users	Pacific Rim	Videoconferencing: The Race to the Desktop	SMDS Survey	Multi-Vendor Cooperative Processing: Is It Possible?		
	2:15 pm - 3:30 pm		**Town Meeting: The Local Exchange: The New Competitive Frontier? 2:15 pm - 4:00 pm**	The Future of the Private Networks: Integrating Switched Broadband Services into the Corporate Network	Packet Networks Internationally	National Data Super Highway	Enterprise Mail Systems: Linking LANs, Mainframes and Public Services		What's New in LAN Hubs? (Part I)	Product Review and Analysis: LAN Operations and Control Systems
	3:45 pm - 5:00 pm	The Status of U.S. and Global Virtual Network Services		Sorting Out Network and Systems Element Managers			Cell Relay: Prospects and Possibilities		What's New in LAN Hubs? (Part II)	High Bandwidth Applications on LANs: Analyzing Performance Issues
THURSDAY, JANUARY 30	8:00 am - 9:15 am	Frame/Cell Relay Plans on the Public Network		Understanding the Impact of Bursty High Bandwidth Applications	Case Study: Networking with International Customers and Suppliers	Cellular as an Alternative in Fixed Applications	Routing SNA and LAN Traffic	Migrating Toward Client-Server Computing	Comparing LAN Open System Choices	
	9:30 am - 10:30 am	**Keynote Presentation: "Frame Relay and SMDS: New Standards for LAN Interconnection" Dr. John McQuillan, President, McQuillan Consulting**								
	10:45 am - 12:00 pm	Customer Controlled Intelligent Public Networks	The RBOC Future: MFJ, Legislative, Regulatory	Network Design and Modeling Tools: Product Update and Analysis	Global Network Management	Digital Cellular			Collapsing Parallel Data Networks	
	12:45 pm - 2:00 pm	Broadband ISDN: An Update	The Interlata Marketplace: Domination or Competition?		Mexico: Impact of Privatization and Free Trade Zone	Automatic Speech Recognition for Interactive Voice Response Systems Users	Internetwork Management	User Experiences in Implementing Integrated Networks and Applications		
	2:15 pm - 3:30 pm	Uniform Service and Pricing Structures: Are They Necessary?	Spectrum: Limited Resource, Unlimited Demand	Traffic Analysis and Performance Monitoring: Product Update and Analysis	Plenary Session Europe 1992 (Part I) Nations and Networks	Voice Recognition Products: Adding Another Sense to Computer Communications	Frame Relay Round-up (Part I)		Evaluation of Intelligent Wiring	Help Desk
	3:45 pm - 5:00 pm				Europe 1992 (Part II) Nations and Networks		Frame Relay Round-up (Part II)			

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Pre-register by December 23 and save up to $100 on full Conference registration. Plus — receive FREE ComNet Exhibit Hall admission — worth an additional $50!

This limited-time offer is extended to *Network World* readers only. To take advantage of these special discount rates, your registration must be postmarked and paid in full by December 23, 1991. You'll receive your credentials by mail and avoid long lines at the door. After December 23, regular conference fees apply.

How to Register:

By Mail: Complete the Advance Registration Form on the reverse side and mail with your payment to:

ComNet '92
P.O. Box 9107
Framingham, MA 01701-9107

By Phone: Call **1-800-225-4698** (in the U.S.) or **508-879-6700** any weekday, 9:00 a.m. - 5:30 p.m. EST. Complete your registration form on the reverse side before your call and have your AMEX, VISA, or MasterCard number ready.

By Fax: For faster registration, complete the registration form and simply fax it to **508-872-8237.**

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☐ YES, I want to discover the latest networking solutions FIRST at the **ComNet '92** Conference.

Sections A–F must be completed to process your registration.

A. Please Type or Print Clearly

Name________________________ Title________________

Company_____________________________________

Address_____________________________________

City________________________ State_____ Zip________

Telephone (_____) ______________________________

B. Your Business or Profession (Circle One)

1. Manufacturing
2. Retailing
3. Wholesaling/Distribution
4. Insurance/Banking/Financial
5. Professional/Service
6. Education
7. Health Care
8. Government
9. Communication Carriers
10. Voice Communications Equip.
11. Computer Equipment
12. Datacom Equipment
13. Information Service
14. Consultant
15. Software
16. Other (Specify)__________

C. Your Job Title/Function (Circle One)

Communications users:

1. General Management
2. Marketing/Sales
3. Production/Operations
4. Telecom Management (Voice/Data)
5. Voice Communications Management Only
6. Data Communications Management Only
7. Network Systems Analyst/Planner
8. EDP System/Program/Planning
9. Local Area Network Management

Communications manufacturers vendors:

10. General Management
11. Marketing/Sales
12. Hardware Manufacturing & Development
13. Software Development
14. Engineering
15. Consultant
16. Other (Specify)__________

D. Size of Your Organization

(Circle One)

1. Under 100
2. 100-499
3. 500-999
4. 1,000-4,999
5. Over 5,000

E. What is your role in the purchasing process of communications equipment and services? (Circle One)

1. Final decision maker
2. Recommend
3. Specify
4. No role

Conference registrations must be cancelled in writing.
Registrations are transferable at no charge.
No one under 18 admitted. This form may be duplicated.

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or Fax to: 508-872-8237.

F. Fees

Many of our tutorial programs sell out early. Seating is limited and will be assigned on a first-come, first-served basis. Indicate your choice of one two-day tutorial, two one-day tutorials or the Executive Symposium (ES) for package 1 or 2 below. Don't be disappointed — send in your registration form today, or call Conference Sales at **(800) 225-4698** to reserve the tutorial session of your choice. We'll bill you later.

	By Dec. 23	After Dec. 23
Save $100		
☐ **Package 1:** 2 days tutorial or 1½-day Executive Symposium 2 days conference Exhibit Hall Tutorial selection(s) __________	$895	$995
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2.4
.400 and X.500 International tandards for Mail and Directories
structor: **Gregory Loux,** Director of dvanced Products, Soft-Switch, Inc.

2.5
etwork Power: Secrets of Success- l Network Management
structor: **Howard Frank,** President, oward Frank Associates

2.6
;DN Will Be Ready in June, 1992. /ill You?
structor: **Michael F. Finneran,** resident, dBm Associates, Inc.

T2.7
Understanding and Selecting International Public Network Service
Instructor: **Daniel Briere,** President, TeleChoice, Inc.

T2.8
IBM Network Strategy and Product Critique
Instructor: **Atul Kapoor,** VP, Kaptronix Inc. and **Jack Baney,** Manager, IBM Networking Systems

T2.9
Standards for Network Computing
Instructor: **L. David Passmore,** Partner, Ernst & Young

10 – LAN Applications	Track Time	
LAN Applications: Where Are They Going?	8:00 am - 9:15 am	WEDNESDAY, JANUARY 29
	9:30 am - 10:30 am	
Networking Windows 3.0	10:45 am - 12:00 pm	
Groupware, An Idea Whose Time Is Now	12:45 pm - 2:00 pm	
	2:15 pm - 3:30 pm	
	3:45 pm - 5:00 pm	
Security and LAN Applications	8:00 am - 9:15 am	THURSDAY, JANUARY 30
	9:30 am - 10:30 am	
nage Documents and ext Retrieval on LANs	10:45 am - 12:00 pm	
	12:45 pm - 2:00 pm	
	2:15 pm - 3:30 pm	
	3:45 pm - 5:00 pm	

See it FIRST at ComNet

After you've learned about the latest technologies in your conference sessions ... see them demonstrated first in the dynamic **ComNet '92** Exhibit Hall. It's your best opportunity of the year to compare and test thousands of the latest products and services. **Over 150 of ComNet's 450 exhibitors will introduce major new products!**

What's more, admission to the exhibits is FREE with your conference registration. And, don't forget to make time to visit the exciting new ISDN Showcase located in the Ramada Renaissance. Exhibits are open Tuesday, January 28 – Thursday, January 30.

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NETWORK WORLD

ComNet ® is produced by World Expo Corporation, an International Data Group Company, the world's leader in information services on information technology.

Master the business of networking at ComNet's new Executive Symposium

Developed for corporate executives and senior MIS/networking managers, the Executive Symposium consists of ten topical, "real-world" sessions designed to explore creative solutions to your business concerns for the 90s. If you're in a leadership role – or plan to be – this is a unique opportunity to meet for a day and a half with world-renowned analysts, consultants and other participants in highly interactive sessions and roundtable discussions.

Monday, January 27 9:00 am - 5:15 pm
Tuesday, January 28 8:45 am - 1:45 pm

Highlights:

Monday

Kickoff Presentation: "**Competitive Advantage 2000,**" presented by **Jim Jewett, Ph.D.,** CEO, Jewett & Associates, Inc. – 9:15 am - 10:15 am

Keynote Luncheon Presentation: "**High Payoff Networking Strategies for the 90s,**" chaired by **Dixon Doll,** Chairman and CEO, DMW Group Inc. – 12:15 pm - 1:45 pm

Featured Presentation: "**Achieving Total Quality Management: The Cadillac Quality Story,**" presented by **Rosetta M. Riley,** Director of Customer Satisfaction, Cadillac Motor Car Division, General Motors, and 1990 winner of the Malcolm Baldrige National Quality Award – 3:45 pm - 5:15 pm

Tuesday

Featured Luncheon: "**Communications Industry Meets the Press**" – top reporters from *The New York Times, Business Week, USA Today* and *The Boston Globe* answer questions on the health of the business, political muscle, hot new companies and mergers to watch out for. Moderated by former FCC Chairman **Richard E. Wiley,** now a managing partner with Wiley, Rein & Fielding – 12:00 pm - 1:45 pm

Other featured speakers include **Larry DeBoever** of Tucker/DeBoever Technologies, Inc.; **L. David Passmore** of Ernst & Young; **Robert E. Lewin** of X/Open; **Joaquin Gonzalez** of the META Group; **Patrick E. Campbell** of the North Carolina National Bank, and **Cory Van Wolvelaere** of Andersen Consulting.

Hands-on, how-to technical workshops teach practical skills

If you're looking for individualized, practical, "real-world" training in applications for network design, management and control, you'll find it in ComNet's Technical Workshop series. Each session is given in two parts; choose one only. Class size is limited, so be sure to reserve your place early.

Technical Workshops

Thursday, January 30 2:15 pm - 5:00 pm
Friday, January 31 8:30 am - 12:00 pm

W3.1
Designing & Building the Network Control Center
Instructor: **James Wetterau, P.E.,** Principal, Networking Solutions

W3.2
Getting Your Best Deal on Outsourcing and Bulk Agreements: For Users Only
Instructor: **Mary Johnston Turner,** Principal, Northeast Consulting Resources, Inc.

W3.3
Worldwide Product/Type Approval and Certification
Instructor: **Thomas Ramsey, Esq.,** Squire, Sanders & Dempsey

W3.4
Internetwork Troubleshooting
Instructor: **Priscilla Oppenheimer,** Sr. Technical Instructor and Course Developer, Network General Corp.

W3.5
Network Design/Analysis: Case Study
Instructor: **Gerald Latham,** Network Design, Customer Solutions and Services, IBM

FREE Conference Sessions offer solutions for federal users

If you're involved in networking for the federal government ... or if you sell to the government, the newly created **Federal Communications Forum** is a "can't miss" for you. These custom-designed courses will focus on the latest developments in government standards, regulations, planning and technology. Each day features a different theme:

"Wide Area Networks: Voice or Data?"
Tuesday, January 28 1:00 pm - 3:30 pm

"LAN and Wireless"
Wednesday, January 29 1:00 pm - 3:30 pm

"Internetworking and Systems Integration"
Thursday, January 30 1:00 pm - 3:30 pm

The **Federal Communications Forum** sessions are FREE with your conference or exhibits-only registration.

Eat, drink and be merry at the

Opening Night Cocktail Reception

Monday, January 27 5:15 pm - 7:00 pm

FREE to all Tutorial and Executive Symposium attendees

Relax ... unwind ... get to know networking professionals from all over the world ... and, have FUN at the end of a busy first day at ComNet. You're cordially invited to enjoy complimentary cocktails, hors d'oeuvres and stimulating conversation at the annual Opening Night ComNet Cocktail Reception!

Register by December 23 and save up to $100
For a complete conference program, call 800-225-4698 today

Announcing the ComNet New Product Achievement Award Competition

ComNet Conference and Exposition — known in the industry as the forum for new product introductions — will introduce a New Product Achievement Award Competition at ComNet '92 to be held January 27-31 at the Washington Convention Center in Washington, D.C. This competition gives exhibiting companies the opportunity to gain worldwide recognition for their new products, enhancements and upgrades.

Rules of the contest . . .

Prior to ComNet '92, a panel of editors and reporters from leading trade publications will review entries submitted by vendors from ComNet's distinguished list of exhibitors. The panel will select ten products they believe will make the greatest overall contribution to the communications industry.

At the show, attendees will have the chance to view the ten products in a special New Product Showcase at the Washington Convention Center, evaluate their performance on the show floor, and vote for the five new products they think are the most innovative and worthy of commendation.

And by casting their ballot, attendees will also be eligible to win a variety of valuable, industry-related prizes — a complete list will be posted at the New Product Showcase.

COM NET
NEW PRODUCT
ACHIEVEMENT
AWARD

And the winner is . . .

The five New Product Achievement Award finalists will be announced at a 2:00 p.m. press conference on Wednesday, January 29 and awarded special trophies during an Exhibitor Reception to be held later in the day.

How to enter . . .

For more information about submitting a product for review by the panel of judges, call Nancy Heleno at 703-739-9288. (Entry forms have already been mailed to all contracted ComNet '92 exhibitors with a deadline of December 6, 1991 for entering a product in the contest.)

For details on attending the ComNet '92 conference and exposition and casting the final vote, call **800-225-4698** and ask for a ComNet account representative.

COMNET 1992 NEW PRODUCT ACHIEVEMENT AWARD JUDGES: David Buerger, *Communications Week;* **Bill Laberis,** *Computerworld;* **Lee Keough,** *Data Communications;* **Patricia Schnaidt,** *LAN Magazine;* **Mary Petrosky,** *LAN Technology;* **Susan Rastellini,** *Networking Management;* **John Dix,** *Network World;* **Paula Musich,** *PC Week;* **Tom Valovic,** *Telecommunications;* and **Andy Jenks,** *Washington Technology*

The New Product Achievement Award Program

ComNet salutes the best new products of 1992.

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NPA

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Association Watch

The **Tele-Communications Association, Inc. (TCA)** recently elected Robert Hamilton of Hewlett-Packard Co. as its 1992 corporate president. Hamilton has been a member of TCA's Colorado chapter and is completing a two-year term as the corporate vice-president of public relations for the association.

During the past 11 years, Hamilton has worked for HP's Greeley, Colo., division in a variety of positions, including senior systems programmer, office automation manager, telecommunications manager and technology engineer.

In his current position as information technology engineer, Hamilton's responsibilities include the implementation of executive information systems that combine state-of-the-art telecommunications with software, personal computers and workstations.

He will take over as TCA president in January.

Omnicom, Inc. recently announced the first three elements in a new curriculum series called **Open Systems Education: Especially for Users**, designed to aid users in planning and implementing open systems.

The components will include an Executive Overview that focuses on issues senior managers face when evaluating open systems implementation. Open systems' impact on productivity will be discussed, and a sample business case will be presented for converting from a proprietary to an open systems environment.

A second component will involve a three-day Open Systems Workshop, sponsored in conjunction with the National Computer Centre in the U.K. It will feature sessions on topics such as open systems architecture and technology and the key stages of an open systems project life cycle.

The third component will cover an Open Systems Video Library, which includes courses in open systems fundamentals, interoperability and specific open systems applications that can be used throughout an organization.

For more information about Open Systems Education, contact Cecilia Siamundo at (703) 281-1135.

Temporary placement of IS execs aids budget crunch

Downsizing victims have short-term job option.

By Maureen Molloy
Staff Writer

RESTON, Va. — In the midst of a recession, many companies are looking to hire temporary employees rather than add permanent staff, even at the executive information systems (IS) level.

To help companies find the right person at the right time, some executive placement firms, such as Dahl-Morrow International and Stamford, Conn.-based Interim Management Corp., have focused on providing seasoned executives for temporary assignments.

Dahl-Morrow, based here, specializes in temporary placement of IS executives and represents another opportunity for out-of-work network executives — victims of corporate downsizing, mergers and acquisitions — as well as net managers considering a career change.

Michael Rogers

Drawing from a pool of nearly 500 executives, the 11-month-old firm has already placed about 30 executives in interim positions — mostly with high-technology companies — for three- to 12-month job stints.

Former company President Robert Ryan was himself an interim executive brought in to start up Dahl-Morrow. He has founded five companies, including international electronic mail provider Dialcom, Inc., and recently left the firm to pursue other interests.

According to current President Barbara Steinem, clients ranging from start-ups to large multinational firms such as British Aerospace Communications, Ltd. have turned to Dahl-Morrow for help in solving an immediate management problem: filling key staff positions quickly.

Steinem labels the trend of hiring interim managers as the human resources version of outsourcing. "Interim executives can save a company money," she said. "It is an inexpensive way for the organization to immediately acquire a person skilled in the areas they are brought in to manage."

For example, companies do not have to offer interim executives benefits or pension packages. In addition, if the temporary hire turns out to be a mistake, it is an easier situation to correct than a hiring error with a permanent executive.

"Although most clients come to us because they need a qualified executive yesterday, the client and candidates often view this as a try-and-buy arrangement to determine if the match will be a good one in the long term," Steinem said.

Headhunters estimate it can take as long as nine months and cost as much as $15,000 to hire a new executive. And benefits alone can represent about a third of a high-level executive's salary.

Digitran Corp., a budding facsimile services company based in Englewood Cliffs, N.J., couldn't wait that long for a network manager capable of building a national network to support its services.

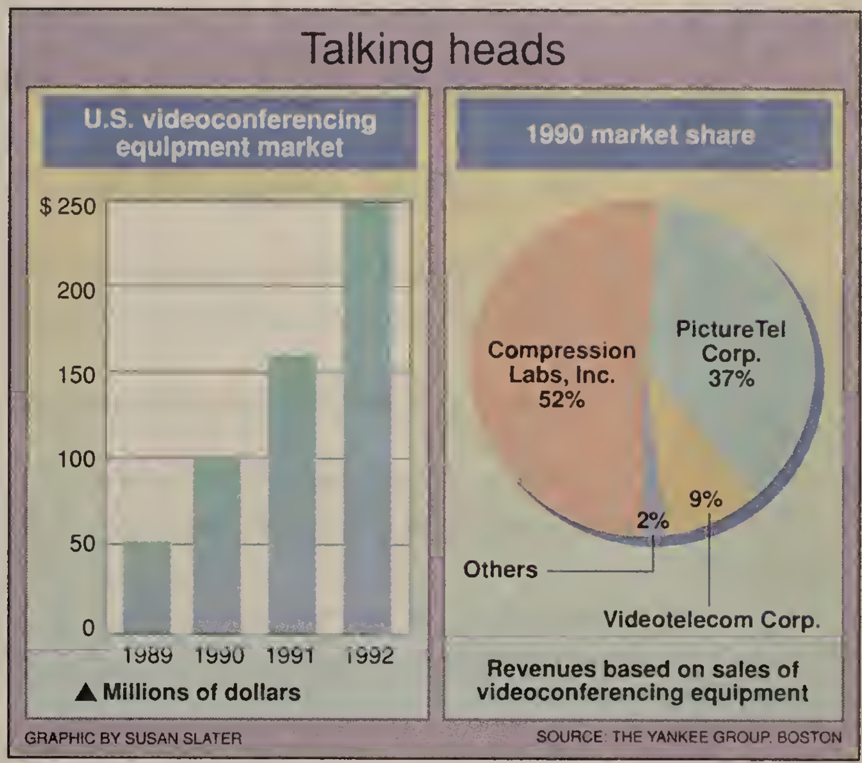
So the company turned to Dahl-Morrow to fill the position quickly. Michael Rogers, a 20-year veteran of the telecommunications industry, was hired two weeks later as Digitran's senior vice-president of operations and development.

Rogers said he chose the temporary job, which will last anywhere from six to nine months, because he is eager to take on short, challenging tasks.

"It's a good fit," he said. "[Digitran] needed someone who could hit the ground running, and I'm looking for an opportunity to make a quick impact and then move on before the job becomes routine."

Rogers, who began at Digitran in August, is deploying switches in Chicago, New York, San Francisco and Washington, D.C. The switches will be augmented with proprietary fax processors and interconnected via a frame relay network. The company expects to have customer traffic on the network by the end of the month.

"The company made a strategic decision to immediately find someone with turnaround experience," Rogers said. "A full-blown search for a permanent manager wouldn't have allowed the launch to go foward as quickly."



Talking heads

GRAPHIC BY SUSAN SLATER

SOURCE: THE YANKEE GROUP, BOSTON

Videoconferencing is going multisite

Users say falling equipment costs, support for standards will drive multisite conference market.

By Wayne Eckerson
Senior Editor

While many companies derive great benefit from point-to-point videoconferencing, users and analysts say the real value of videoconferencing comes when multiple sites participate in the same meeting.

"Multipoint videoconferencing is about to take off," said Basil Halhed, president of Halhed Enterprises, Inc., a consulting company in Dunrobin, Ontario, that specializes in videoconferencing.

Richard Yee, a systems consultant at MetLife, said bridging more groups into a videoconference improves the quality of group decisions and generates better ideas in brainstorming and planning sessions.

In 1990, MetLife purchased a video bridge from PictureTel Corp. Since then, the insurance company has averaged two multipoint videoconferences a month with three or four sites involved. The company conducts about 60 point-to-point sessons a month, Yee said. .

"We always knew we wanted to do multipoint, but we waited until a good [multipoint control unit] came out on the market," said Yee, who expects the company to expand its use of multipoint videoconferencing.

While most videoconferences today are point to point, that may change once the price of multipoint video bridges declines significantly and videoconferencing suppliers build gear based on CCITT standards, according to users and analysts.

While MCUs, or video bridges, are still in the pricey range between $75,000 and $100,000, users and carriers are snapping them up faster than expected.

Compression Labs, Inc. (CLI) came out with an MCU last year and expected to sell 40 units in the first two years after its release. To date, the company has sold 90 of the devices, according to John Walsh, senior vice-president of strategy and planning at CLI in San Jose, Calif.

Walsh said 75% of the MCUs that CLI has sold have gone to users, while 25% were bought by carriers, such as US Sprint Communications Co., which is using them to provide videoconferencing services to users over the public network.

Mark Lowenstein, a senior analyst at The Yankee Group, a market research group in Boston, said companies will find multipoint videoconferencing most useful for communicating with suppliers, customers and business partners.

However, makers of coder/decoders, which convert analog video signals into digital signals for transmission across telephone lines, must begin building equipment to CCITT standards before intercompany videoconferences become a possibility, Lowenstein said.

Currently, few suppliers build to CCITT standards, making it impossible for users to hold videoconferences with other companies that use codecs and MCUs

(continued on page 58)

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ความมีประสิทธิภาพต่อเนื่องกันที่จะได้จากโครงสร้างทางการสื่อสารคมนาคมในภาคพื้นเอเชียแปซิฟิคนั้น ขึ้นอยู่กับการตัดสินใจเลือกผู้ที่จะทำหน้าที่สื่อสารให้

ท่านต้องการมากกว่าการนำหน้าทางเทคโนโลยี่อันตรงตามเป้าหมาย ท่านต้องการบริษัทที่มีทรัพยากรที่จะช่วยสนับสนุนท่านต่อเนื่องกันไป หลังจากที่บรรลุผลทางเทคโนโลยี่แล้ว

ซึ่งก็หมายความว่าท่านต้องการบริษัทสื่อสารที่ช่วยแนะแนวทางแก้ปัญหาต่างๆ เช่นกำหนดกฎเกณฑ์ของรัฐบาล ปัญหาตรวจคนเข้าเมือง ที่อยู่อาศัย ตลอดจนการศึกษา

ก็น่าจะมีเหตุผลดีด้วยที่จะดำเนินธุรกิจในประเทศที่ภาวะทางการเมืองและสังคม อยู่ในสภาพคงที่ในกาลอนาคตที่พอเล็งเห็นได้

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เมื่อท่านพร้อมมีกลไกเอเชียแปซิฟิค เข้าใจกันได้ง่ายนิดเดียวว่า ทำไมท่านจึงเลือก โอ ที ซี ออสเตรเลีย

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Worth Noting

AT&T will supply switching equipment to Kalori Communications Group, a consortium led by Hutchison Whampoa, Ltd., if Kalori wins a license to become Australia's second carrier. That contract should be awarded by year end.

World News

The **International Telecommunications Satellite Organization** last week announced that four people have been nominated to take over as director general of INTELSAT in place of Dean Burch, who passed away earlier this year.

The candidates are John Hampton, acting director general of INTELSAT; Irving Goldstein, chairman of the board and chief executive officer of Communications Satellite Corp., the U.S. INTELSAT signatory; John Mills, special adviser in the policy unit of the U.K. Prime Minister's office; and Jonathan Parapak, secretary general of Indonesia's Ministry of Tourism, Posts and Telecommunications.

The new director general is expected to be selected during INTELSAT's Board of Governors meeting to be held Dec. 5-11 in Washington, D.C.

Congress' **Office of Technology Assessment (OTA)** recently issued a critique of the process by which the U.S. government established its negotiating position for the World Administrative Radio Conference (WARC) '92 in February.

At WARC '92, countries from around the world will seek to reallocate radio frequencies to emerging technologies. The OTA report warned that a lack of cooperation between U.S. spectrum policymakers and a lack of resources could impede the U.S.' ability to protect its interests.

NTT America's Taketo Suzuki

NTT considers venture for int'l outsourcing services

Carrier also wants to offer virtual net services.

By Barton Crockett
Senior Editor

NEW YORK — A top official at Nippon Telegraph and Telephone Corp. (NTT) said the Japanese carrier is considering entering into a joint venture with a carrier from the U.S. or another country to provide global net outsourcing services.

NTT has also petitioned the Japanese government for permission to offer virtual networking services but has not yet received approval, said Taketo Suzuki, president of NTT America, Inc., during a recent interview at the company's headquarters here.

NTT America is the U.S. subsidiary of NTT, Japan's dominant domestic carrier.

According to Suzuki, NTT is interested in providing global private network outsourcing services to meet the growing international requirements of Japanese companies. He said teaming with British Telecommunications PLC (BT) on the carrier's new Syncordia Corp. venture is only one of several options NTT is evaluating.

BT is courting NTT and Germany's Deutsche Bundespost Telekom as equity partners in Syncordia, which is building a global network to provide global net outsourcing services. But Suzuki said NTT could also work with Japan's dominant international carrier, Kokusai Denshin Denwa Company, Ltd. or a U.S. carrier to provide global outsourcing services.

"Syncordia is one of the candidates to actualize NTT's interest," he said. "And there are a couple of other ideas."

According to Suzuki, NTT faces increasing pressure to expand internationally as Japan's international carriers expand domestically by building their points of presence closer to users in metropolitan areas. This reduces the need for users to lease lengthy private lines from NTT in order to access the international carriers' global gateways.

However, the same Japanese regulatory restrictions that keep the country's international carriers from becoming large domestic service providers also limit the extent to which NTT can compete in the international market.

Japanese law, for example, prohibits NTT from providing private-line and public switched telephone services across Japanese borders. Therefore, one of the only ways the carrier can enter the international market is by providing international outsourcing or value-added services.

NTT could also buy or establish a carrier in a foreign country, provided the carrier does not focus on providing service to and from Japan. For example, earlier this year, NTT expressed an interest in buying a stake in Mexico's national carrier Telefonos de Mexico, S.A. de C.V. But any large international expansion by NTT is likely to raise eyebrows in Japan's Ministry of Posts and Telecommunications, which could ultimately block such a move.

Virtual net filings stalled

NTT has also asked the Ministry of Posts and Telecommunications for permission to provide virtual networking services in Japan, Suzuki said. NTT first filed a petition to provide these services in the country seven or eight years ago, he added.

But Suzuki said the regulators have not yet approved the service, partly because it would involve offering large corporate users substantial volume discounts, something Japanese regulators

(continued on page 30)

Users divided on int'l LAN internet services

As global router and frame relay services hit the mart, some users struggle to determine their value.

By Barton Crockett
Senior Editor

As value-added network (VAN) service providers roll out global local-area network interconnection services, users are wrestling with the arduous chore of determining whether the offerings are a good investment.

New international frame relay and public router services are adding variety to the tried-and-true menu of private-line, public switched telephone and X.25 services that have been the mainstay of global data nets for years.

But so far, users are giving these new services mixed reviews, with some lauding the new global LAN internet services and others questioning whether they can deliver adequate throughput and are worth the cost.

VAN providers, convinced there is a market for global router and frame relay services, are rushing to introduce new offerings. In June, Infonet Services Corp. launched its Infolan global router service, which supports the Transmission Control Protocol/Internet Protocol and Source Route Bridging and is now available in 11 countries. And by year end, BT North America, Inc. plans to extend the same frame relay service to the U.K. and France that the VAN provider cut over in the U.S. in September.

Some users, however, have found it difficult to compare the price and performance of international frame relay and router services with other, more established international offerings.

One user with this dilemma is Jack Haverty, internet architect at Oracle Corp. in Redwood Shores, Calif. Oracle runs a global data net based on Netrix Corp. #1-Integrated Switching System (ISS) switches in Australia, France, the Netherlands, the U.K. and the U.S. Those devices feed several Wellfleet Communica-

(continued on page 30)

French gov't commissions group to certify net wares

By Anne Kerleo-Wendt
IDG International News Service

PARIS — The French government recently created a new organization that will certify all network equipment in the country for compliance with pan-European standards.

Laboratoire d'essais d'agrement (LEA), in Lannion, France, will certify network equipment for conformance with Normes Europeennes de Telecommunications (NET) standards. NET standards are pan-European network standards established by the European Telecommunications Standards Institute, a nonprofit organization in Nice, France, sanctioned by the European Community.

The decision to establish LEA introduces two key network equipment testing changes in France. First, all testing will now be performed in one place rather than in both Paris and Lannion as happened previously.

Second, this separates the roles of operating the network — the responsibility of France Telecom — from the job of certifying network equipment. European Community officials argue that national carriers often abuse their control over network certification to favor national suppliers and vendors with whom the carriers have marketing agreements. Previously, all network equipment certification in France was handled by Cnet, France Telecom's research and development arm.

France needed to establish LEA now because a new European Community directive will soon take effect, requiring all Common Market countries to accept NET compliance certifications from each other.

These directives also require Common Market countries to establish testing facilities that are separate from national carriers. These "mutual recognition of type approval" directives are supposed to make it easier for users and vendors to get network equipment certified for use throughout the Common Market.

Currently, users and vendors must approach each Common Market country separately to certify network equipment for use on a carrier's network.

NTT considers int'l outsourcing

continued from page 29

do not currently allow.

"Too much discount for a big company is not fair to smaller companies," Suzuki said.

He declined to predict if Japanese regulators will ever give NTT permission to offer virtual net services.

Suzuki added that the lack of large discounts has helped make corporate networks in Japan much less sophisticated than their U.S. counterparts.

But Japan is far more advanced in deploying and using Integrated Services Digital Networks than the U.S., Suzuki said. Currently, ISDN Basic Rate Interface (BRI) services are available in about 90% of Japan, and more than 90,000 ISDN BRI access lines are currently in service.

Additionally, Suzuki pointed out that Japan has forged a political consensus between regulators, users and vendors in favor of ISDN. He said, in his opinion, the U.S. has been unable to forge a similar consensus. ◼

Users divided on int'l services

continued from page 29

tions, Inc. routers collocated at sites with the #1-ISS switches as well as other remote sites.

In the U.S., the Netrix switches are linked via fractional T-1 private lines, while internationally, Oracle relies predominantly on 64K bit/sec circuits.

Oracle uses international private lines to provide network services to company offices in about 20 countries and public X.25 and public switched telephone services to serve offices in an additional 70 countries.

Thus far, Oracle has found that vendors' global LAN internetworking services are priced similarly to private lines running at the same speed, Haverty said. But he worries about the performance that the global router and frame relay services will provide.

Even though public router service vendors are willing to provide dedicated access at speeds of 56K bit/sec and higher, they have not been able to guarantee that bandwidth across their networks, according to Haverty. "I don't think anybody has enough experience in the field to make those kinds of commitments," he said.

Haverty said the public router services may operate without any problem when first installed, but once the carrier's vendors add more users, traffic may peak periodically and reduce subscriber throughputs. Oracle could, therefore, pay the same amount to lease a 56K bit/sec international private line but receive far less than 56K bit/sec throughput at certain times.

"What I want to know is, if I can only get 10K bit/sec on my 56K bit/sec [public router service], does that mean, from the vendor's perspective, that it's up or down?," Haverty said. "Mostly, what the vendors are saying is that we're the first people asking those questions."

Public frame relay service providers are guaranteeing end-to-end throughputs, but since frame relay is a new technology, Haverty is not sure how much throughput the network equipment on the user's premises will be able to support.

Victor Fischer, MIS director at MIPS Computer Systems, Inc. in Sunnyvale, Calif., had nothing but praise for the Infolan service the company has been using for the past three months.

MIPS Computer Systems uses the TCP/IP public router service to carry electronic mail and file transfer traffic between Unix hosts in company offices in Boston, Dallas, London, Munich, Germany, Paris, Sunnyvale and Tokyo. Infolan replaces the public X.25 service that MIPS Computer Systems previously used.

Infolan costs about the same as the X.25 service the company was receiving from Infonet, Fischer said. But MIPS Computer Systems receives two to three times greater throughput with Infolan because TCP/IP traffic can run in native mode and does not have to be encapsulated in X.25 packets.

"We're very pleased with the service and support we get from Infonet, and we think we made a good choice here," he said. ◼

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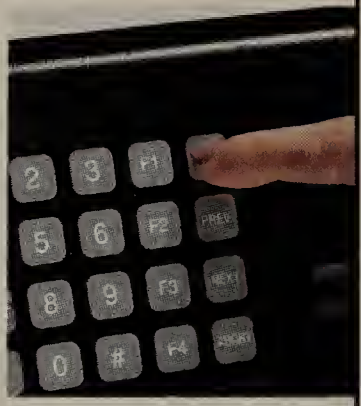

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PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

Software lets portable PC users access All-In-1

Digital Equipment Corp. recently unveiled software that enables portable personal computer users to access DEC's All-In-1 electronic mail system.

Mobilizer for All-In-1 is software that runs on any portable personal computer running MS-DOS 3.3 or higher. The personal computer must have 1M byte of random-access memory and 512K bytes of disk storage.

The software simulates an All-In-1 session, letting portable computer users create, read, store and send E-mail messages over any modem or line supporting DEC's Local Area Transport protocol.

Available immediately, the software is priced at $145. A Mobilizer for All-In-1 software package for DEC's VAX/VMS server running All-In-1 is also required and costs $50.

Digital Equipment Corp., 146 Main St., Maynard, Mass. 01754; (617) 897-5111.

RAD unveils low-cost, remote Ethernet bridge

RAD Network Devices, Inc. recently unveiled a bridge designed to link Ethernet-based remote workstations, terminal servers or computers to an Ethernet via point-to-point or public network links.

The **ETE-8M** is a stand-alone device with one wide-area network interface and one local-area network interface. Users can choose V.35, V.24/RS-232, X.21, V.36/RS-422, RS-530 or a four-wire WAN interface.

On the Ethernet side, they can also choose an attachment unit interface to support 10Base5, a BNC interface to support 10Base2 or an unshielded twisted-pair interface for 10Base-T LANs.

ETE-8M connects as many as eight remote workstations to an Ethernet network over serial links running at 9.6K to 256K bit/sec.

ETE-8M is available now, and pricing starts at $1,849.

RAD Network Devices, Inc., 7711 Center Ave., Suite 600, Huntington Beach, Calif. 92647; (714) 891-1964.

Firm adds Windows support to LAN-based 3270 gateway

Data Interface unit supports Rumba, Relay Gold.

By Joanne Cummings
Staff Writer

AUSTIN, Texas — Data Interface Systems Corp. last week announced that it has enhanced its IBM 3270 gateway to support Microsoft Corp. Windows workstations running Wall Data, Inc.'s Rumba and Microcom, Inc.'s Relay Gold.

With the addition of Windows support, users of Data Interface's DI3270 Open Windows gateway can establish 3270 terminal-emulation sessions from either DOS workstations or Windows clients running Rumba and Relay Gold.

According to Albert Lowenstein, president of Data Interface, the gateway is designed to provide a cost-effective solution for local-area networks in which only a few workstations are running a Windows interface or in which workstations are running multiple 3270 emulators, such as Relay Gold or Rumba.

With one gateway, users can support both Windows and non-Windows workstations, rather than upgrading all workstations to Windows at once, he said.

DI3270 Open Windows gateway will enable Windows users as well as DOS clients on Novell, Inc. Internetwork Packet Exchange (IPX) LANs to conduct 3270 sessions with IBM mainframes. Like the previous version, DI3270 Open Windows software resides on a LAN-attached personal computer or workstation configured as a gateway. It supports as many as 253 concurrent 3270 sessions with an IBM host, Lowenstein said.

The company is planning to support other 3270 packages within the next year or so, including Attachmate Corp.'s Extra! for Windows, Network Software Associates, Inc.'s Dynacom Elite and Digital Communications Associates, Inc.'s Irma Workstation for Windows. It also plans to support Network Basic I/O System networks as customer demand warrants.

The DI3270 Open Windows gateway is currently available with Relay Gold support; Rumba support is expected by year end. The gateway is priced from $1,095 to $4,495, depending on the number of users.

For more information, contact Data Interface at 8701 N. Mopac Blvd., Suite 415, Austin, Texas 78759, or call (512) 346-5641.

HP plotter attaches to NetWare nets

PALO ALTO, Calif. — Hewlett-Packard Co. last week unveiled an ink jet plotter that can be directly connected to Novell, Inc. NetWare local-area networks supporting design applications.

The HP DesignJet is the company's first plotter that can be directly attached to a LAN. It is designed for work groups of between six and 20 users and is targeted at users of computer-aided design software running on LAN-attached personal computers or workstations.

The plotter comes standard with centronics and serial interface ports. It also has a slot that can hold an optional Ethernet card for attaching the device to a Novell, Inc. NetWare LAN.

That card has an attachment unit interface for connection to thin-wire Ethernet cabling or twisted-pair wiring. It is priced at $695.

The HP DesignJet features an Intel Corp. 32-bit i960 Reduced Instruction Set Computer processor. This enables the plotter to complete a 300 dot/in. printout measuring 34 by 44 inches in less than six minutes, according to Ormond Rankin, manager of network printer operations at HP. This rate is about twice as fast as traditional pen-type plotters, he said.

The plotter is compatible with the HP-GL/2 graphical printer language, which provides for 80% data compression. This speeds data throughput so the plotter does not become a bottleneck to the network, according to Rankin.

The plotter comes standard with an Autodesk Device Interface driver for HP GL/2, which makes it compatible with Autodesk, Inc.'s AutoCAD Release 10 and AutoCAD Release 11, which are popular LAN-based computer-aided design packages.

The HP DesignJet is currently available and is priced at $10,995.

For more information, contact HP at 3000 Hanover St., Palo Alto, Calif. 94304, or call (800) 752-0900.

Da Vinci reinvents its LAN E-mail package

Firm adds features, employs modular architecture that lets users move to standards-based services.

By Joanne Cummings
Staff Writer

RALEIGH, N.C. — Da Vinci Systems Corp. recently announced a major redesign of its electronic mail software, based on new features and a modular architecture that gives users the flexibility to migrate to standards-based messaging services.

Instead of using a design that limits users to Da Vinci's proprietary services for E-mail transport, directory services and database technology, the vendor adopted a modular architecture so customers can employ Da Vinci's E-mail front end and use it with standard transport, directory or database services.

In addition to the software's modular redesign, Da Vinci eMAIL 2.0 for DOS offers a variety of new features, including file folder functionality, conversation tracking, editing and spell-checking.

The vendor decided to overhaul the E-mail package's design because it recognized a growing trend among users to demand standard E-mail transport mechanisms, such as X.400, instead of proprietary schemes, said Chris Evans, vice-president of marketing ("Users await next generation of E-mail," *NW*, May 13).

Like the previous version, Da Vinci eMAIL 2.0 for DOS software resides on a Novell, Inc. NetWare server and requires DOS Version 3.0 or later. It is fully compatible with Novell's Message Handling Service (MHS) 1.1 or MHS 1.5.

But the new version enables users to employ Da Vinci's proprietary E-mail front end with industry-standard transport, directory and storage services. For example, a user could stop using Da Vinci's proprietary transport scheme for delivering E-mail messages and instead use MHS or X.400.

Users could also replace Da Vinci's directory services software module with an X.500 directory or a proprietary company-wide directory system. They could also replace Da Vinci's storage module, which is used to store and retrieve mail messages from a database and instead use an SQL database.

New features

Da Vinci eMAIL 2.0 for DOS, which is fully compatible with the company's earlier DOS version, includes a new file folder function that enables users to organize and archive received mail in various folders designated by the user.

Version 2.0 also includes the ability to track a series of E-mail messages that form a conversation. This is especially useful for users who have received a reply to a previous message but have forgotten the context. By choosing the conversation option, users can display all the messages involved in the conversation and, thus, can easily piece together the sequence of events.

The new version also contains a spell-checking function.

> The new version enables users to edit messages using new cut and paste functions.

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In addition, the software enables users to edit messages using new cut and paste functions. According to Evans, the spell-checker and editing functions make the system more appropriate for sending formal messages.

Da Vinci eMAIL 2.0 for DOS also enables users to attach different personal computer file formats to E-mail messages so the files and messages can be viewed together. For example, using the attach command, a user could link a spreadsheet file to a message concerning a company's quarterly expenditures.

The new version also includes the ability for a system manager to develop E-mail addressing templates. These templates can be used by end users to easily address their E-mail messages.

Da Vinci eMAIL 2.0 for DOS is available now. It costs $295 for a 10-user starter package. There is an additional charge of $175 for a license to expand the base package by five users, $995 to expand it by 30 users, $2,995 to expand it by 100 users and $19,995 to expand the license by 1,000 users.

For more information, write to Da Vinci at P.O. Box 17449, Raleigh, N.C. 27619, or call (919) 881-4320.

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OPINIONS

PC LANS

BY W.D. RILEY

Some helpful guidelines on networking users

Who wouldn't want to be networked? We know the advantages, such as electronic mail and sharing databases and printers.

In reality, however, networking presents some problems, not the least of which is the financial investment incurred by even the most modest system. I'm not talking about inexpensive peer-to-peer systems, which inherently place limits on expansion and versatility. I'm talking about networks with dedicated file servers, network interface cards and asynchronous servers. I'm talking about serious hardware.

When users ask for a network, close examination will usually expose any frivolous requests, but even serious petitions may not be reasonable given departmental budgets and work load.

If the request involves custom software that runs only on a network and that generates revenue, the decision is an easy one. In other cases, it will benefit the client, and because that's really what we're here for, that decision is also easy. But because final approval is not mine, I am continually placed in the position of a backseat driver, shouting over the driver's shoulders, hoping users don't wreck the car by buying something they don't need. If they do, the blame is mine.

> The cost of a network begins with the equipment and continues forever.
>
> ▲▲▲

I offer the following advice for network support staff:

■ **If possible, buy from one vendor.** When the inevitable problems occur, you have one firm to talk to and it can't point the finger at someone else.

■ **Use quality products for all network operations.** If you think it's difficult to find out why some device or piece of software doesn't work as a stand-alone unit, wait until it's hooked up to a network.

■ **Pretrain all network users.** Every person on a network should have some basic networking skills as well as a general idea of how a network functions.

■ **Save money by sharing.** If a new network is about to spring up in an established network area, upgrade the existing server and connect the two groups whenever possible.

That method may not be an option if the old group had a small network software platform such as Novell, Inc.'s Entry Level Systems, but the software used to control any group with more than 20 end users is expensive and should be maximized whenever possible.

■ **Don't take on more than you can handle.** The new network will eventually become someone's support problem. Hold off on new systems until you have the support staff to keep them running. After all, putting the network in place is only the first step. Software installation and regular maintenance continue long after the thrill of the connection has passed. If you stretch your network people too thin, something will have to give.

The cost of a network begins with the equipment and continues forever. If you don't think there's going to be a direct benefit, don't plug in another system. In every discussion, include continuation of software and hardware upgrades and support requirements. Your end users may not be happy, but this approach will limit the surprises that come after installation. ◻

Riley is a microcomputer support manager for the City of Hope National Medical Center in Duarte, Calif.

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EDITORIAL

Interoperability should be major focus of LAN vendors

We've heard a lot of promises in recent years from local-area network operating system vendors about supporting one another's protocols. But these companies haven't delivered on their promises — and they aren't likely to, unless users demand interoperability.

The big four LAN operating system vendors — IBM, Banyan Systems, Inc., Microsoft Corp. and Novell, Inc. — have not made true interoperability between their systems a high priority. Instead, they've emphasized creating links to a wider number of clients, particularly Unix, Apple Computer, Inc.'s Macintosh and Windows 3.0.

The interoperability problem may be assuaged now that IBM is selling both its own LAN Server operating system and Novell's NetWare, but that remains to be seen. What is clear is that most LAN operating system vendors have been reluctant to support true interoperablity, fearing erosion of their client base.

In some cases, there is low-level interoperability between LAN operating systems. But a DOS workstation running one vendor's client and accessing servers running another's operating system would require repeated rebootings and the loading of multiple redirectors.

For true interoperability between servers, the two LAN operating systems have to support each other's protocols. Novell servers would need to support Microsoft's Server Message Block/Network Basic I/O System Extended User Interface, for instance, or Microsoft servers would have to support Novell's Internetwork Packet Exchange. For competitive reasons, these vendors are moving quite slowly toward doing this.

To be sure, third-party gateway products can help users communicate between two LAN operating system realms. But the use of gateways can be a clumsy and expensive way of designing a network.

Users shouldn't be tied to one vendor's LAN operating system. They should have the flexibility to deploy different operating systems for various applications, and the LAN operating systems should interoperate.

The best way for users to achieve this is by voting with their dollars for the most open products and by working with organizations such as the new Open User Recommended Solutions (OURS) group, which was created specifically to push vendors for high-level interoperability. OURS can be reached at (800) 237-6877.

As network products grow more complex, so do the problems of making them work together. In this case, only user pressure is likely to start vendors working on a solution. ◻

OPINIONS

MACROSCOPE

BY JAMES KOBIELUS

The challenges of managing mobile terminals

Today's network managers are as ill-prepared for the age of the mobile terminal as information systems professionals were for the emergence of the IBM Personal Computer and its brethren 10 years ago.

Mobile voice, data and facsimile terminals are taking over the workplace and will soon become the dominant personal productivity tools for most workers. This growing importance of mobile terminals will force network managers to address five operational concerns.

The first is property management. How can you keep track of a corporate resource that has no fixed address? How can you guard against theft, substitution, cannibalization and damage to mobile terminals?

One approach to limiting a company's losses would be to bond mobile terminal users. Another would be to require users or their work groups to put up security deposits before issuing terminals. A third method would be to require users to have their terminals regularly inspected in order to keep track of all issued components.

The second issue is connectivity. Networks should be redesigned to remove all barriers to full locational transparency for mobile users. The barrier-free network will consist of the following components:

- **Standard network interfaces and adapters.** Mobile terminals should come equipped with standard, portable network interfaces and adapters for office and on-the-road connectivity. These interfaces will range from the familiar RS-232-C and data modem to more exotic items such as ISDN terminal adapters, fax modems, cellular modems and wireless local-area network transceivers.
- **Local docking.** Companies should modify their LANs to provide convenient docking facilities for mobile terminals. Docking stations support cabled or radio frequency LAN access and remove the barriers to full intraoffice user mobility. Each desktop could contain a docking station that provides a monitor, keyboard and printer of better quality than those included with each mobile terminal.
- **Internetwork handoff.** Wireless private branch exchanges and LANs will create a demand for internetwork handoff solutions that allow users to stray beyond the confines of their offices and, without loss or degradation of service, connect into commercial wireless networks.

Mobile voice, data and facsimile terminals are taking over the workplace.

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Network managers should require wireless equipment vendors to negotiate handoff agreements with commercial carriers.

The third issue network managers must address is remote control. Mobile terminals derive much of their power from their ability to access data and control applications, processors, storage devices and other peripherals at the office. Remote control software provides a critical peer-to-peer linkage between the mobile machine and the computers at the user's home base. Network managers should make remote control software standard on every mobile and fixed computer.

Fourth, because mobile terminals can wreak havoc on corporate data integrity and security, network managers must consider these issues as well. Systems managers have been struggling for almost 10 years to impose centralized data management on scattered personal computers, and they've just begun to show results.

Now net managers must contend with renegade mobile terminals that threaten to multiply the number of existing redundant, inconsistent databases and files. Data theft and eavesdropping will become difficult to prevent because computers will spend as much of their time off the corporate premises and network as on it.

The final issue is troubleshooting and support. Obviously, on-site mobile users will enjoy speedier trouble response than users 500 miles away from the office. Mobile terminal users will have to learn rudimentary troubleshooting so they can make do until trained technicians can be dispatched. Overnight courier services may be the solution for providing backup terminals and spare parts to remote users on short notice.

Telecommunications managers must reassess their networks and operations to determine the best way to support mobile users. For most users, mobility is the norm, not the exception. Network managers know this instinctively because a great deal of their time, budget and manpower — often as much as 30% to 50% — is spent moving users' terminals and associated station cabling.

Wireless technologies make station moves easy, painless and inexpensive for both the user and the technical staff.

We are still living in the Stone Age of personal computing and communications. By the year 2000, the notion that computing and communications access must be tied to physical locations will be outdated. Users must always have their terminals and information tools with them wherever they roam. ☒

Kobielus, a contributing editor to Network World, *is a telecommunications analyst with Fairfax, Va.-based Network Management, Inc., one of the largest local- and wide-area network systems integrators in the U.S.*

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TELETOONS

BY FRANK AND TROISE

So... how'd the end-user feedback survey turn out?

LETTERS

A few important points

In his column "Documentation, training shouldn't be afterthoughts" (*NW,* Oct. 7), Douglas Welch presented a good discussion of the importance of documentation and training in a network project. However, he missed some important points about what makes user documentation and training truly successful.

First, users should keep in mind that materials provided by vendors are by necessity product-focused and generalized for the widest audience. What most users need are materials that describe product application and use as it affects their daily job. Ask your vendor for customized materials or have a technical communicator develop them for you.

Second, remember that task-oriented information should supplement feature-oriented materials to help the user gain a practical understanding of the product. Your users are expert resources for this, and you may gain some valuable input on product requirements from them.

Finally, on-line help messages, visuals and job aids such as keyboard templates and quick reference cards can provide the most critical information in a form that users will actually use.

As a technical communicator specializing in telecommunications and networking products, I encounter a lot of user confusion about new systems and technologies. But I've found that documentation and training that gives users information to apply a product effectively in their daily work leads to higher levels of user acceptance.

Janice King
President
MarkeTech
Bellevue, Wash.

Network World *welcomes letters from its readers.*

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Letters may be edited for space and clarity.

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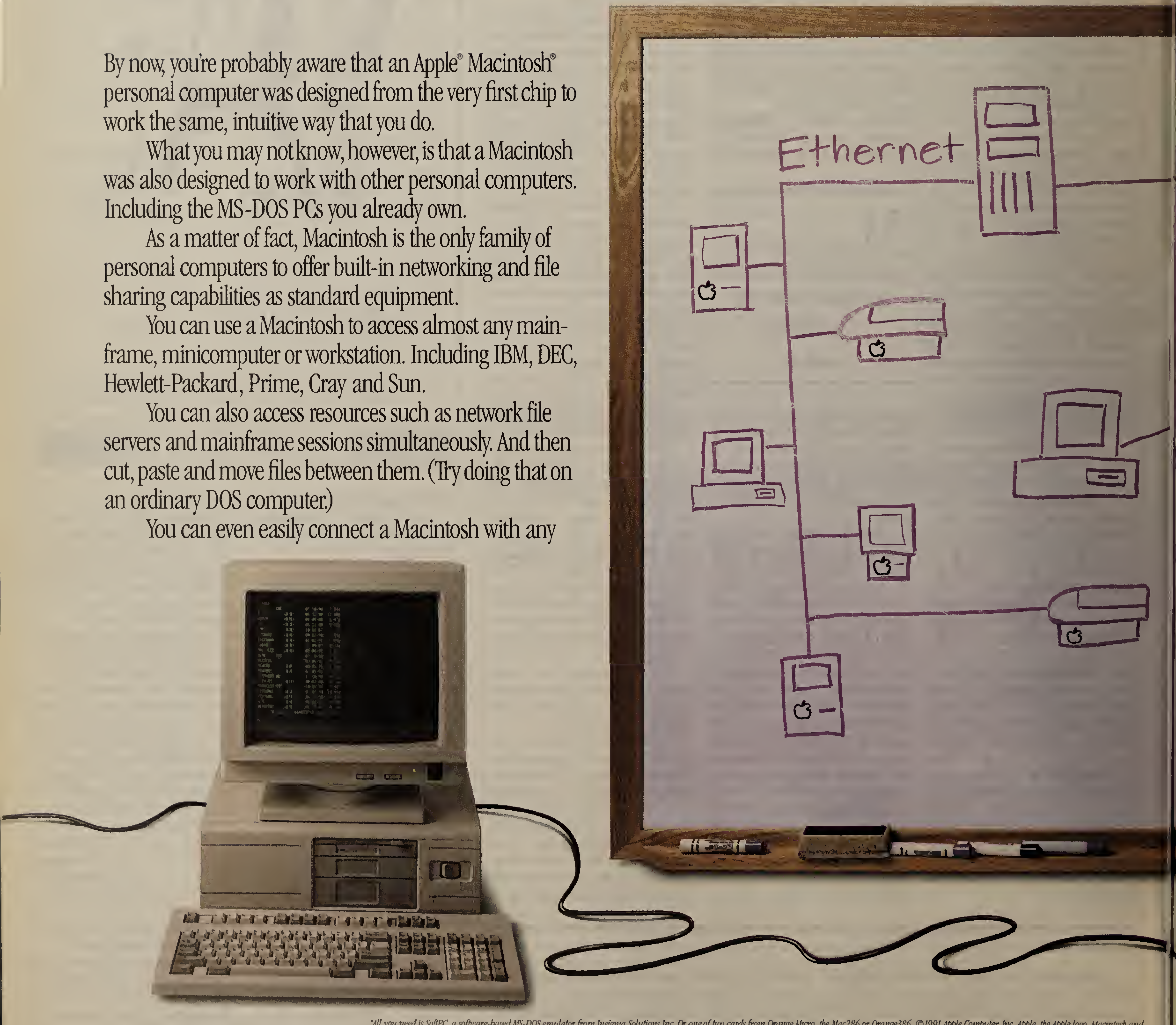

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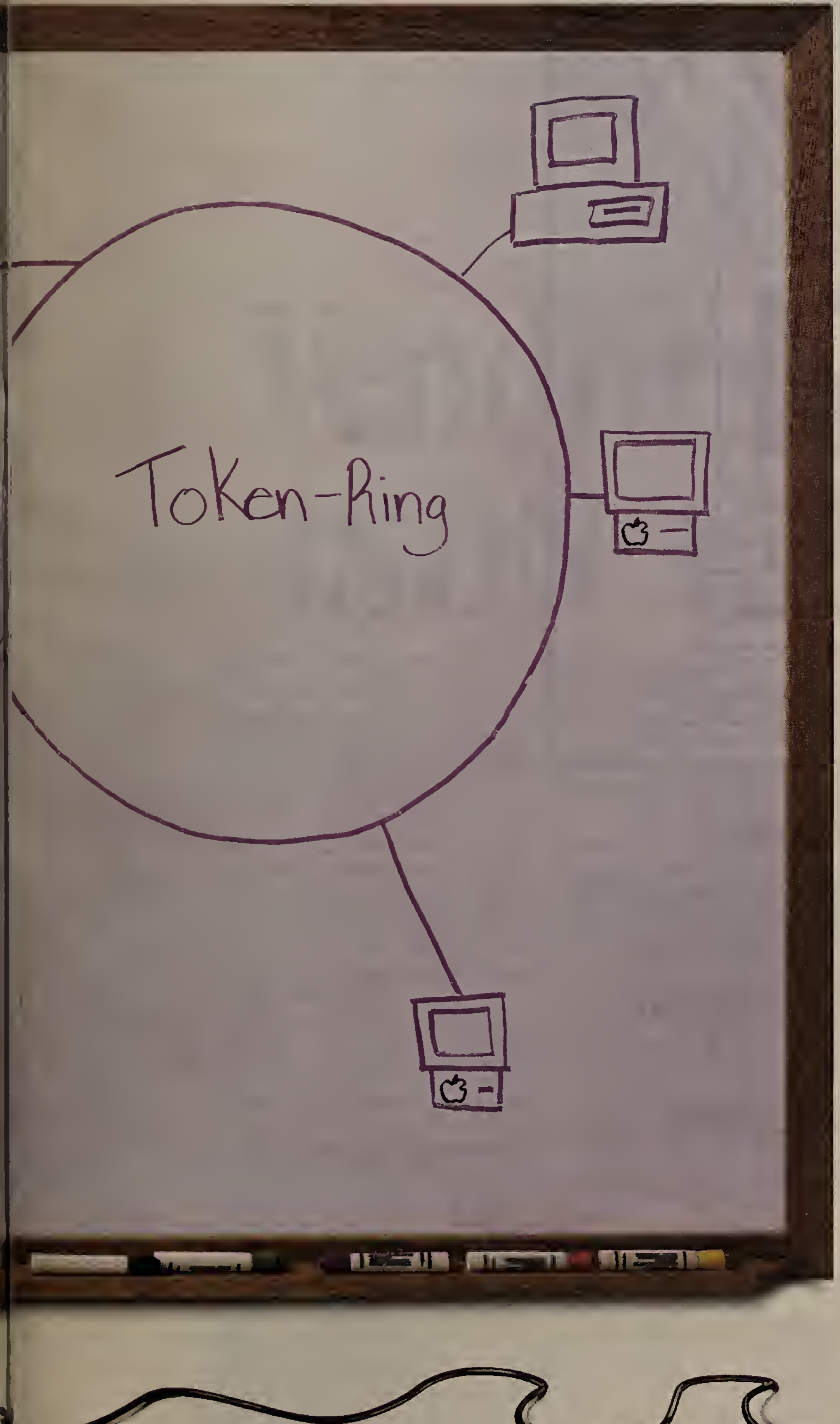

industry-standard Token-Ring or Ethernet network. And share files and printers over Novell NetWare, Banyan VINES, IBM LAN Server or Microsoft LAN Manager networks.

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DATACOM

BUYER'S GUIDE

ISDN EQUIPMENT

Vendors rush into ISDN CPE market

CONTINUED FROM PAGE 1

The most dramatic increase is in vendors that offer ISDN multiplexers, gateways and controllers. In 1990, six firms fit in this category; now there are 18.

Some of the companies that announced their initial ISDN equipment offering last year include Apple Computer, Inc., Promptus Communications, Inc., Link Technology, Network Express, Inc., Hunmat Corp. and Primary Rate, Inc.

End users are the major beneficiaries of these announcements. The combination of declining ISDN service costs and more ISDN equipment may make the technology a viable alternative for more users.

It is important, however, to keep in mind that not all ISDN equipment works with every carrier's ISDN service. Equipment makers and carriers are working to change this situation with the hope that someday users will be able to mix and match various ISDN equipment with different carriers' ISDN services.

The fundamentals of ISDN customer premises equipment are well known. Such equipment provides links to a Basic Rate Interface (BRI) circuit, which has two 64K bit/sec circuit-switched B channels and one 16K bit/sec packet-switched D channel, or to a Primary Rate Interface (PRI) circuit, which has 23 64K bit/sec B channels and one 64K bit/sec D channel.

Some ISDN equipment provides links to switched services based on ISDN's H0 channel, which defines the creation of a 384K bit/sec data stream, and its H11 channel, which defines a 1.536M bit/sec stream.

While B channels provide basic transmission capacity, ISDN's D channel offers out-of-band signaling as well as transmission capacity. The D channel enables users to manage, allocate, access and integrate applications from

(continued on page 50)

Kanupke is president of Kanupke Associates, Inc., a telecommunications consulting firm located in Haddonfield, N.J. He can be reached at (609) 354-6167.

CHART • GUIDE

Three Buyer's Guide charts comparing a wide variety of ISDN customer premises equipment begin on pages 40, 51 and 52.

> As the number of vendors nearly doubles, users can afford to be more selective.

ISDN terminal adapters, telephone sets and adapter boards (continued on page 50)

Company	Product	Description	ISDN features	Central office switch/service compatibility	Rate	Protocols	Bandwidth treatment	ISDN services	Price
Apple Computer, Inc. Cupertino, Calif. (408) 996-1010	Apple ISDN NB Card	Plug-in adapter card for connecting Apple Macintoshes to ISDN BRI for messaging, windows	Voice/data adapter for Macintoshes; NuBus card compatible with Macintoshes; standard analog phone set interface; supports speeds up to 64K bit/sec; includes Apple's ISDN Telephone Applications Development Package; API	AT&T 5ESS, Northern Telecom DMS-100	V.110/V.120	Protocol-transparent	User-selected data on B or D channels	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	$1,099
AT&T Business Communications Systems Bridgewater, N.J. (800) 247-1212	PC/ISDN Platform	Plug-in adapter card for connecting IBM PCs, ATs and XTs and AT&T PCs to AT&T Definity and ISDN BRI services	Voice/data adapter for providing BRI features for AT&T Definity; also used for non-ISDN connections; analog phone set interface; API; supports speeds up to 64K bit/sec	AT&T 5ESS	AT&T DMI Mode 2 for 19.2K bit/sec, DMI Mode 3 for 56K/64K bit/sec	Protocol-transparent	User-selected data on B or D channels	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	$1,395
AT&T Network Systems Morristown, N.J. (800) 222-7278	PC TA Card 1000	Plug-in adapter card for connecting IBM PCs, ATs and XTs, Compaq Computer, Inc. PCs, AT&T PCs to ISDN BRI	Voice/data PC adapter for IBM PC, AT and XT or EISA bus; COM support; supports Hayes Microcomputer Products, Inc. AT Command Set; standard analog phone set interface; supports speeds up to 19.2K bit/sec	AT&T 5ESS	Packet-switched data only	Data protocols X.3, X.31	Data on D channel	Circuit-switched voice and packet-switched data on D channel	$499
	ISDN 3270 Data Modules	Stand-alone IBM 3270 terminal adapter for IBM 3270 coaxial elimination	Data only; connects IBM 3270-type terminals to ISDN; coaxial elimination; models include 3270T, 3270C	AT&T 5ESS	V.120	IBM BSC, SNA	Data on any B channel	Circuit-switched data	$860
Dale, Gesek, McWilliams & Sheridan, Inc. Mt. Laurel, N.J. (609) 866-1212	ISDN IDC Card; models include PC/53, ISDN DSP PRI, ISDN DSP BRI	Plug-in adapter board for connecting IBM PCs, ATs and XTs to ISDN BRI; ISDN PRI version for data, image, video applications	Voice/data adapter; analog voice port; NIST API; RS-232; asynchronous speeds up to 19.2K bit/sec; synchronous speeds up to 64K bit/sec; supports DGM&S's circuit/packet Q-Source Applications Development Kit and Digital signal processor; DGM&S API available	AT&T 4ESS and 5ESS, Northern Telecom DMS-100	V.110, V.120	Protocol-transparent, also HDLC	Contiguous H0 channel, H11 channel for IDC PRI applications supporting 128K bit/sec supported on IDC BRI and PRI, and PRI board (Nx64K bit/sec)	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	IDC PRI costs $2,395, IDC BRI costs $1,995, PC/53 costs $1,395
DigiBoard St Louis Park, Minn. (612) 943-9020	ISDN TelAdapter	Plug-in adapter board for connecting IBM PCs, ATs and XTs and IBM MCA PS/2s to ISDN BRI	Voice/data; supports speeds up to 64K bit/sec; COM1/COM2 support; analog phone interface; ISDN call manager applications interface; terminal emulation	AT&T 5ESS	X.25	Protocol-transparent	Vendor compression technique for 128K bit/sec	Circuit-switched voice, packet-switched data, B or D channels	$1,395
Fujitsu Network Switching of America San Jose, Calif. (408) 954-1088	SR Series	Stand-alone terminal adapter that connects 2 data devices to ISDN BRI for fax, video, image applications	Data with voice connection; RS-232, 2 V.35 ports; asynchronous speeds up to 19.2K bit/sec, synchronous speeds up to 64K bit/sec; dual B channel for 128K bit/sec videoconferencing; models include 400 and 410	AT&T 5ESS, Northern Telecom DMS-100	V.110, V.120	Protocol-transparent	User-selected data on B or D channels	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	$750
Gandalf Data, Inc. Wheeling, Ill. (708) 459-9348	TA-1	Stand-alone terminal adapter that connects 2 data devices to ISDN BRI	Data only; RS-232, V.35; synchronous to 64K bit/sec; rack-mountable; front panel controls; supports 2 data interfaces	AT&T 5ESS, Northern Telecom DMS-100	V.110	Protocol-transparent	64K bit/sec on any B channel	Circuit-switched data	$1,295
Hayes Microcomputer Products, Inc. Norcross, Ga. (404) 449-8791	Hayes ISDN PC Adapter	Plug-in adapter board for connecting IBM PCs, ATs and XTs to ISDN BRI	Voice/data; supports Hayes AT Command Set Extended for ISDN, Hayes ISDNBIOS; terminal speeds up to 64K bit/sec on B channels; circuit/packet; X.25 PAD included	AT&T 5ESS, Northern Telecom DMS-100	V.120	Data protocols X.3, X.28, X.29, X.25	User-selected data on B or D channels	Circuit-switched voice, packet-switched data, B or D channels	$1,599
Hunmat Corp. St. Paul, Minn. (612) 224-5634	ZepherLink	Plug-in adapter board for connecting IBM PCs, ATs and XTs to ISDN BRI for video, data applications	Data only; voice optional; RS-232, V.35; supports speeds up to 64K bit/sec on B channels, 16K bit/sec on D channel, up to 144K bit/sec over single B-channel interface for applications; NIST API	AT&T 5ESS, Northern Telecom DMS-100	V.110, V.120	Data protocols and frame relay	Vendor compression technique on B channels	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	$995, including selected options
IBM Armonk, N.Y. (914) 288-3148	IBM 7820	Stand-alone terminal adapter for connecting data devices to ISDN BRI	Data only: 2 synchronous interfaces; RS-232, V.35, X.21; supports speeds up to 64K bit/sec	AT&T 5ESS, Northern Telecom DMS-100	V.110, V.120	IBM BSC, SNA	User-selected data on B channel	Circuit-switched data	$1,826
	ISDN Interface CoProcessor/2	Plug-in adapter board for connecting IBM PC, AT and XT and MCA PS/2s to ISDN BRI	Data-only adapter for PS/2 MCAs or PS/2 AT buses PC running DOS or OS/2; supports speeds up to 64K bit/sec over B channel; 3270 emulation	AT&T 5ESS, Northern Telecom DMS-100	V.110, V.120; 56K/64K bit/sec	IBM BSC, SNA	User-selected data on B channel	Circuit-switched data	$1,195
	IBM 3174 Adapter	Controller adapter board for connecting IBM 3174 terminals to ISDN BRI	Data-only adapter board for 3174 communications controller; synchronous up to 64K bit/sec; NetView support; compatible with all 3174 features	AT&T 5ESS, Northern Telecom DMS-100	V.110, V.120; 56K/64K bit/sec	IBM BSC, SNA	User-selected data on B channel	Circuit-switched data	$4,800
ICL North America Stamford, Conn. (203) 326-2700	I$_3$	Plug-in adapter board for connecting IBM PCs, ATs and XTs and EISA bus PCs to ISDN BRI for data, video, image applications	Voice/data; supports speeds up to 64K bit/sec on either B channel; X.25 data on D channel; RS-232; connects analog phone; Microsoft Corp. Windows-based Telephone Manager Package, API Toolbox	AT&T 5ESS, Northern Telecom DMS-100	V.120	Data protocols IBM SNA	User-selected data on B or D channels	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	Basic model costs $1,495; with software options, $2,195
Integrated Network Corp. Bridgewater, N.J. (908) 218-1800	CM-384/PRI	Stand-alone terminal adapter for connecting data devices to ISDN PRI for video, image, LAN-to-LAN, host-to-host applications	Data only; 2 V.35, RS-366 interfaces; AT&T H0 channel support; supports data speeds up to 384K bit/sec; desktop, rack-mountable	AT&T 4ESS, AT&T SDDN 384K bit/sec (H0 channel)	NA	Protocol-transparent	Contiguous H0 channel	Circuit-switched data	$5,995
ISDN Technologies Corp. Mountain View, Calif. (415) 960-1025	PRImate-PC	Terminal adapter/controller for connecting data devices to ISDN PRI for video applications	Data only, V.35 interface; 64K bit/sec, 384K bit/sec (H0 channel), 1.536M bit/sec (H11 channel) via PRI for video	AT&T 4ESS, AT&T SDDN 384 (H0 channel)	NA	Protocol-transparent	Contiguous H0 channel, H11 channel	Circuit-switched data	$8,300

ACD = Automatic call distribution
API = Application program interface
BRI = Basic Rate Interface
DMI = AT&T's Digital Multiplex Interface
EISA = Extended Industry Standard Architecture
H0 = 384K bit/sec (contiguous bit stream)
H11 = 1.536M bit/sec (contiguous bit stream)
MCA = Micro Channel Architecture
NA = Not applicable
NIST = National Institute of Standards and Technology
PRI = Primary Rate Interface
SDDN = AT&T Software-Defined Data Network

This chart includes a representative selection of ISDN terminal adapters, telephone sets and adapter boards. These vendors may offer other similar products, and other vendors not included may offer a full range of products. Some vendors not listed did not respond to the survey or do not offer ISDN customer premises equipment. Readers should contact vendors directly for price and product feature information.

SOURCE: KANUPKE ASSOCIATES, INC., HADDONFIELD, N.J.

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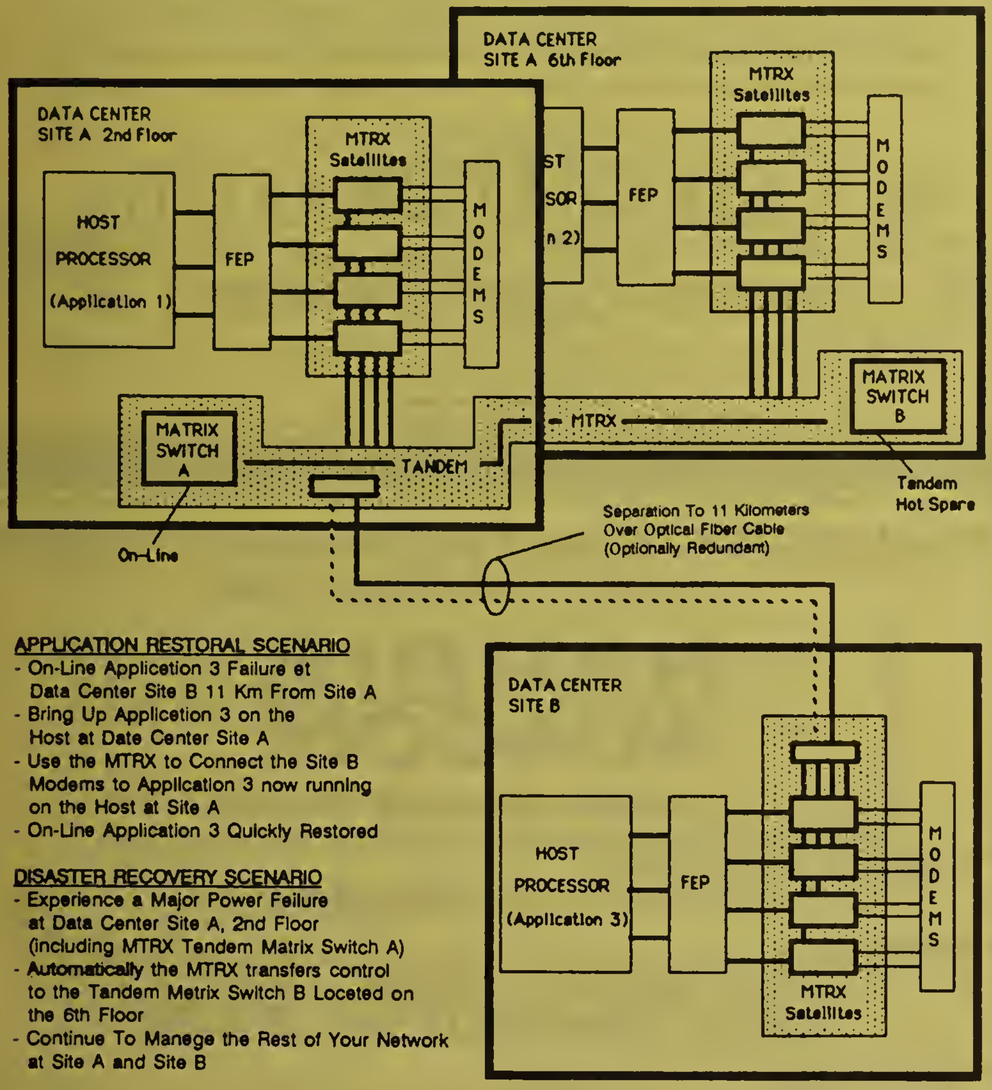

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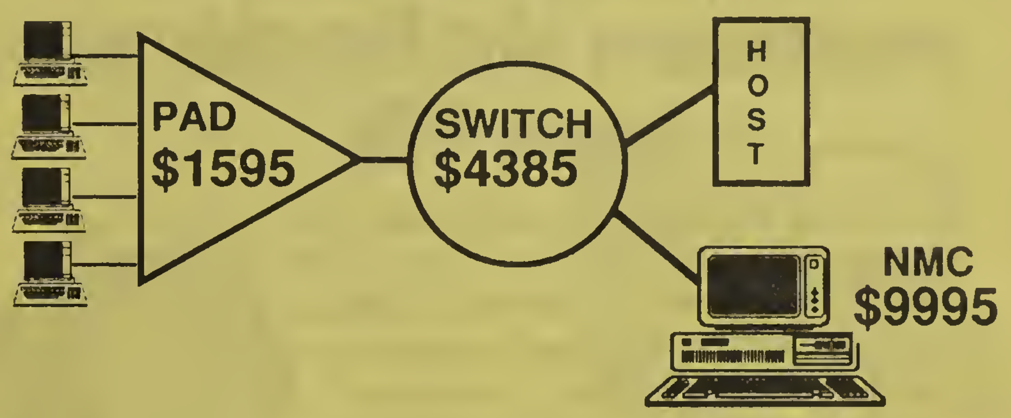

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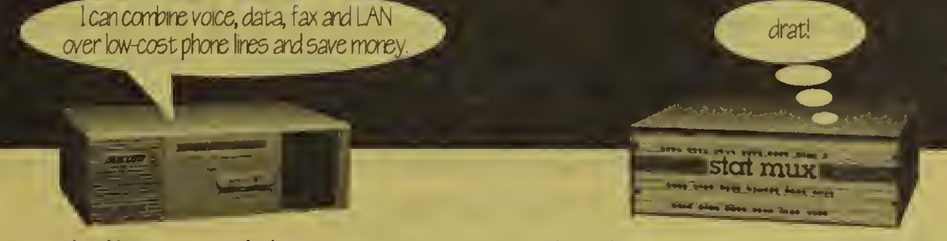
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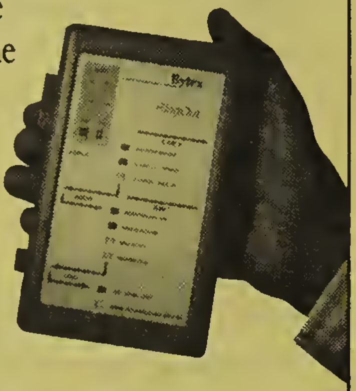

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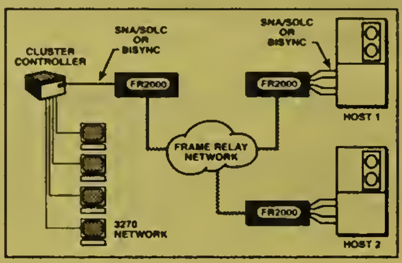

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Circle Reader Service No. **20**

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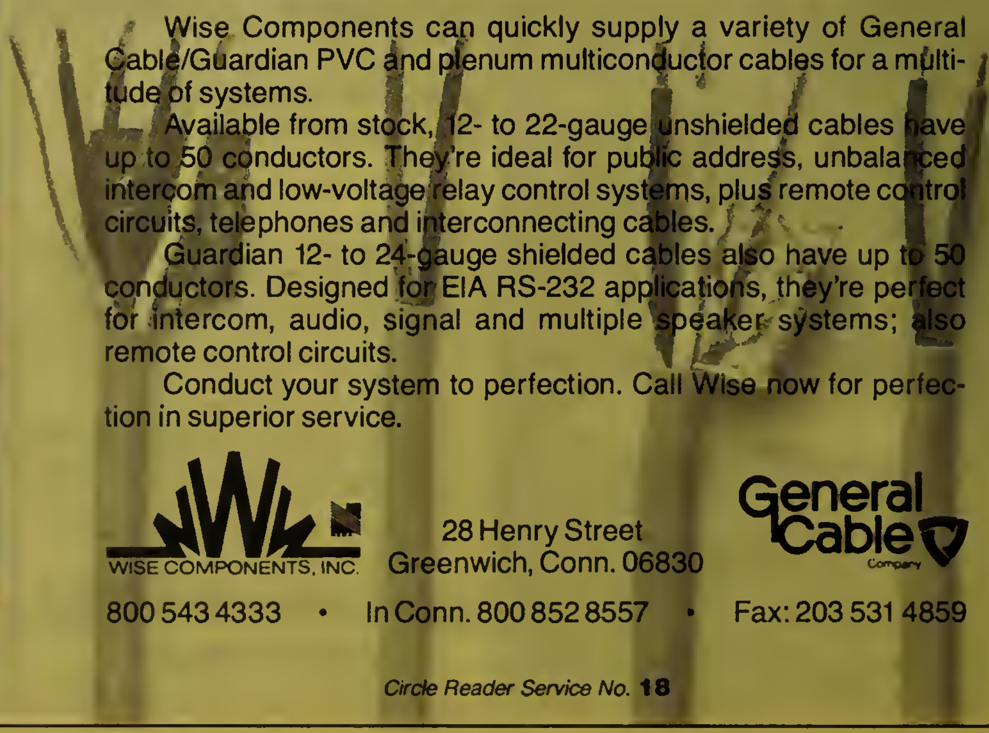

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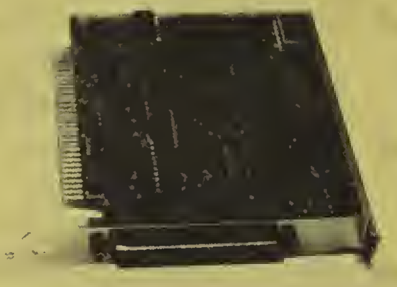

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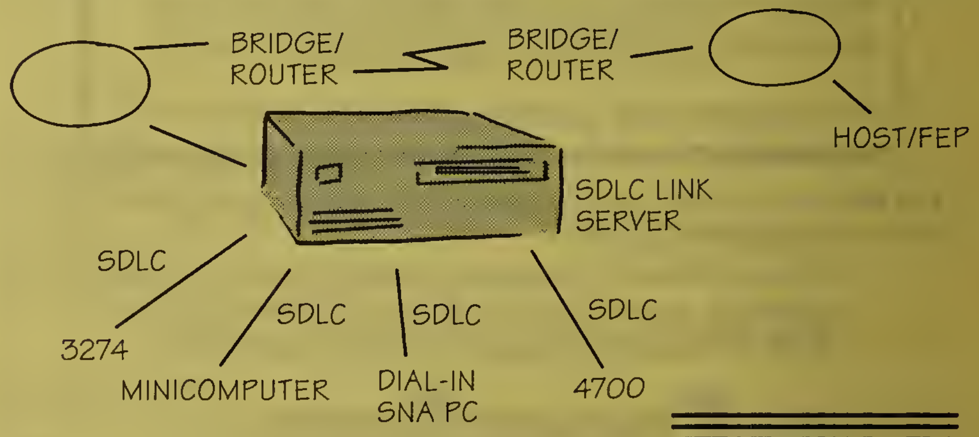

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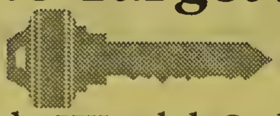

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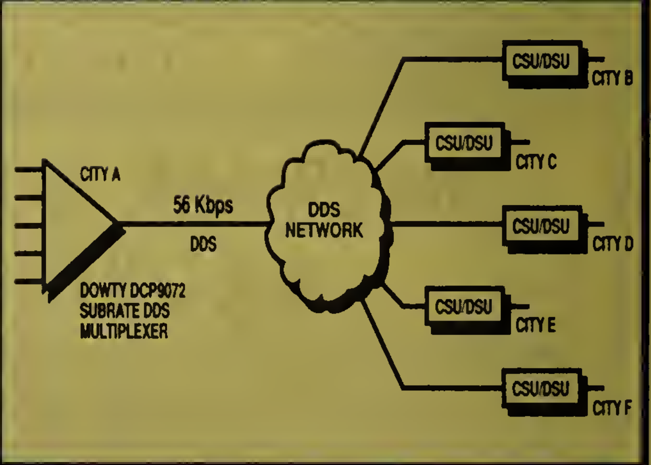

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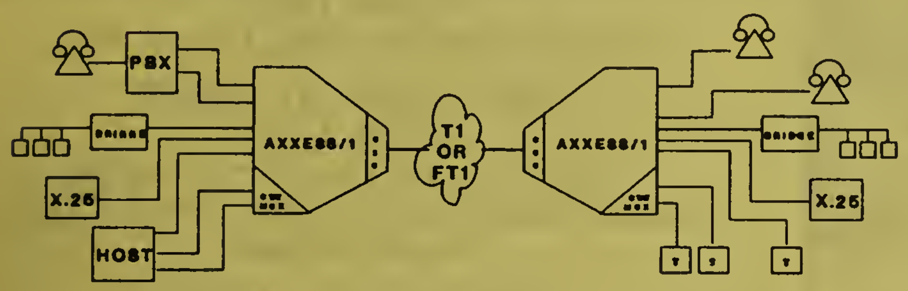

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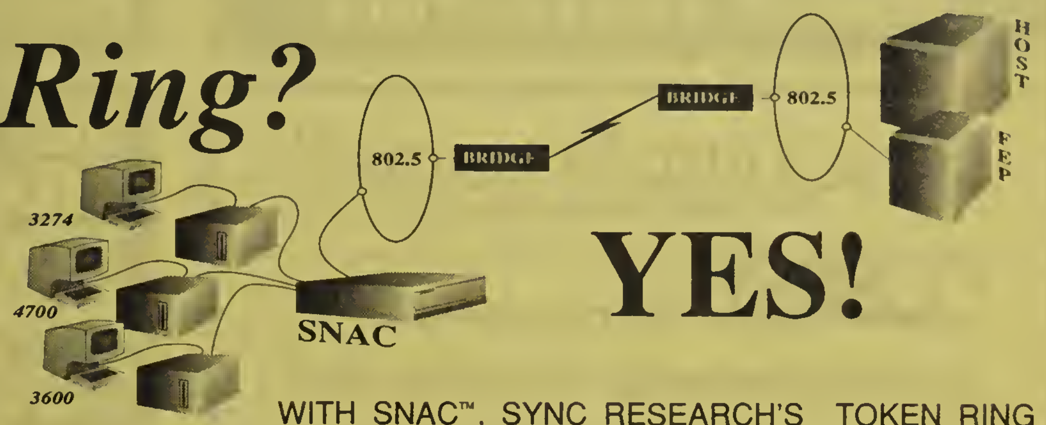

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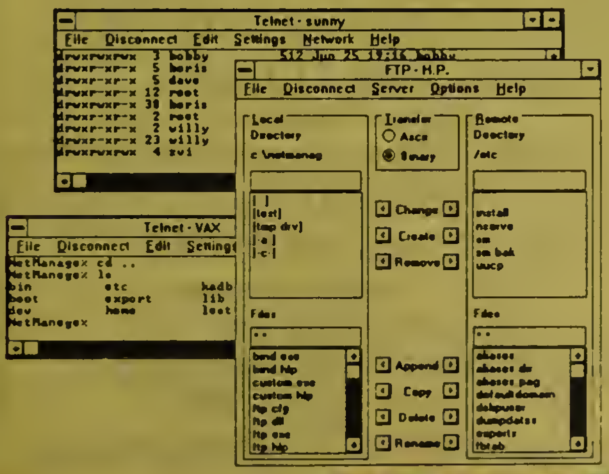

```
drwxrwxrwx  3 bobby
drwxr-xr-x  5 boris
drwxr-xr-x  5 dave
drwxr-xr-x 12 root
drwxrwxr-x 38 boris
drwxr-xr-x  2 root
drwxr-xr-x  2 willy
drwxr-xr-x 23 willy
drwxrwxrwx  4 zvi
```

```
NetManage% cd ..
NetManage% ls
bin        etc        hadb
boot       export     lib
dev        home       lost
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```

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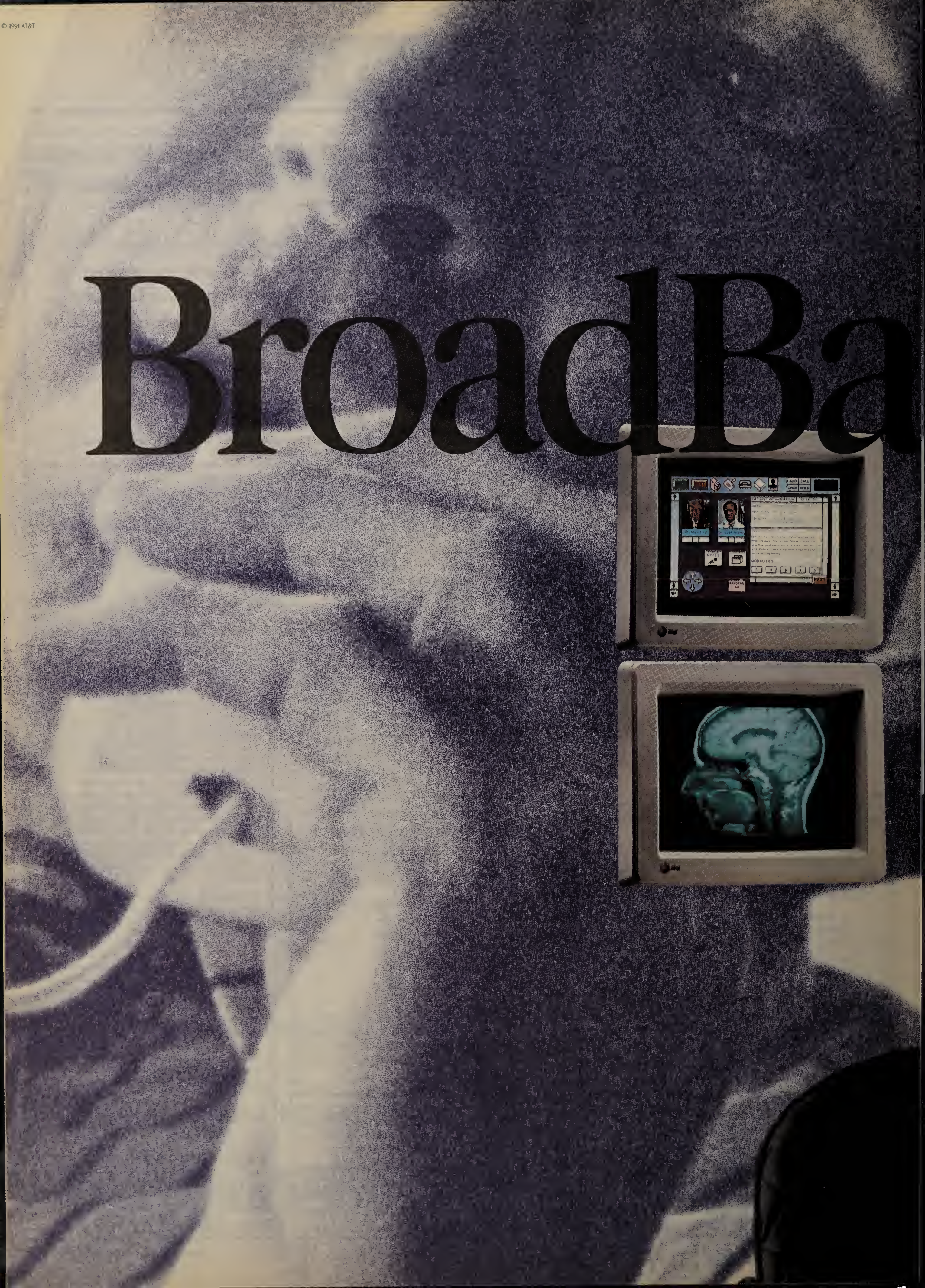

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AT&T
Network Systems

ISDN terminal adapters, telephone sets and adapter boards (continued from page 40)

Company	Product	Description	ISDN features	Central office switch/service compatibility	Rate	Protocols	Bandwidth treatment	ISDN services	Price
Link Technology **Langhorne, Pa.** **(215) 357-3354**	INFO Series	Plug-in adapter board for connecting IBM PCs, ATs and XTs for call management, data applications	Data only; interfaces to voice messaging products; synchronous to 64K bit/sec; API for applications development; NETBIOS, NIST API; models include INFOPartner, INFOlink	AT&T 5ESS, Northern Telecom DMS-100	V.120	Data protocols	User-selected data on B or D channels	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	$295
Motorola Codex **Mansfield, Mass.** **(508) 261-4000**	8860 ISDN Terminal Adapter	Terminal adapter for connecting data interfaces to ISDN BRI	Data only; RS-232, V.35; asynchronous speeds up to 38.4K bit/sec; synchronous speeds up to 64K bit/sec; multiple B-channel multiplexing	AT&T 5ESS	V.110	Data protocols	Data on any B channel	Circuit-switched data	$1,995
NCR Corp. **St. Paul, Minn.** **(612) 638-7777**	NCR ISDN PC Terminal Adapter	Plug-in adapter board for connecting IBM PCs, ATs and XTs for messaging, windows and imaging applications	Voice/data; supports Hayes AT Command Set; COM support; DOS or OS/2; RS-232, asynchronous speeds up to 38.4K bit/sec, synchronous speeds up to 19.2K bit/sec; voice messaging module; supports NCR's Voice/Data Manager; NCR API	AT&T 5ESS	V.110, V.120	Data protocols and HDLC	User-selected data on B or D channels	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	$1,695
Newbridge Networks, Inc. **Herndon, Va.** **(703) 834-3600**	1600 Series Terminal Adapter	Terminal adapter for connecting data devices to ISDN BRI	Data only; asynchronous or synchronous; RS-232, V.35 interfaces; supports speeds up to 64K bit/sec	NA	V.110	Data protocols	64K bit/sec on B channel	Circuit-switched data	$1,150
Northern Telecom, Inc. **Nashville** **(919) 992-4156**	M5000TD1 ISDN Terminal Adapter	Terminal adapter for connecting data devices and Group III fax to ISDN BRI	Voice/data from desktop; Supports Hayes AT Command Set; RS-232, V.35 interface; Hayes Autostream Protocol; analog phone support	Northern Telecom DMS-100	V.120, Northern Telecom T-Link	Data protocols	User-selected data on B or D channels	Circuit-switched data, packet-switched data, B or D channels	$1,400
OST, Inc. **Chantilly, Va.** **(703) 817-0400**	PC SNET	Plug-in adapter board for connecting IBM PCs, ATs and XTs to ISDN BRI	Voice/data; supports speeds up to 64K bit/sec on either B channel; X.25 data on D channel; connects analog phone; Microsoft Windows software, NETBIOS emulation	AT&T 5ESS, Northern Telecom DMS-100	V.110, V.120	Data protocols	64K bit/sec on any B channel	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	$1,695
Primary Rate, Inc. **Salem, N.H.** **(603) 898-1414**	PRI Controller Series	Plug-in adapter board for VMEbus computers and systems connection to ISDN PRI	Data only; add-in controller board for VME bus systems; multiple PRIs; models include PRI-24, PRI-48	AT&T 4ESS, AT&T SDDN 384 (H0 channel)	NA	Protocol-transparent	Contiguous H0 channel, H11 channel	Circuit-switched data	PRI-24: $5,700; PRI-48: $6,200
Promptus Communications, Inc. **Portsmouth, R.I.** **(401) 683-6100**	T-1 CommServer TA	Stand-alone terminal adapter for connecting data devices to ISDN switched services for imaging, video, LAN-to-LAN applications	Data only; dual V.35, RS-449, RS-530; Nx64; D-channel signaling; supports speeds up to 56K, 64K, 384K and 1.536K bit/sec	AT&T 4ESS and 5ESS, Northern Telecom DMS-100 and DMS-250	NA	Protocol-transparent	Inverse Nx64K bit/sec, contiguous H0 channel, H11 channel	Circuit-switched data	AT&T H0 model: $5,900; Nx64 US Sprint Communications Co. and MCI Communications Corp. model: $7,200
Rockwell CMC **Santa Barbara, Calif.** **(714) 833-4383**	CMC-1800	Plug-in adapter board for connecting VMEbus systems to ISDN PRI service from AT&T	Data-only adapter for VME workstations and platforms; connects 23 B+D; switched 384K bit/sec (H0 channel), 1.536M bit/sec (H11 channel); ISA bus	AT&T 4ESS	V.120	Data protocols	Contiguous H0 channel, H11 channel	Circuit-switched data	$3,995
Teleos Communications, Inc. **Eatontown, N.J.** **(908) 389-5700**	B101 PC Terminal Adapter	Plug-in adapter board for connecting IBM PCs, ATs and XTs and MCA PS/2s to ISDN BRI	Voice/data; IBM compatibles; analog voice port; circuit, packet; supports speeds up to 128K bit/sec combined; S/T, 2B1Q versions, 2 models S/T and U interface, Teleos API, NIST API; IBM 3270 emulation	AT&T 5ESS, Northern Telecom DMS-100	V.120	Data protocols and IBM Link Access Procedure E for 3174 protocol	64K bit/sec on any B channel, applications supporting 128K bit/sec	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	$1,395
	Escort	Stand-alone terminal adapter for connecting data devices to ISDN PRI services for imaging, video, LAN-to-LAN applications	Data only; dual V.35, RS-449, RS-530; Nx56K and Nx64K bit/sec, H0 channel, H11 channel	AT&T 4ESS, Northern Telecom DMS-250	NA	Protocol-transparent	Inverse Nx64 contiguous H0 channel, H11 channel	Circuit-switched data	$5,900
Telrad, Inc. **Westbury, N.Y.** **(516) 921-8300**	MPA 19	ISDN terminal adapter	Data-only rack-mountable adapter; supports as many as 32 B channels; 16 D channels, RS-232; supports speeds up to 9.6K bit/sec	AT&T 5ESS, Northern Telecom DMS-100	V.120	Asynchronous	User selected data on B or D channels	Circuit-switched data, packet-switched data, B or D channels	$550 per channel
UDS Corp. **Huntsville, Ala.** **(205) 430-8000**	TA100 Series	Stand-alone terminal adapter for connecting data devices to ISDN BRI	Voice/data; supports asynchronous/synchronous speeds up to 64K bit/sec; RS-232, V.35, supports Hayes AT Command Set; models include 100, 120; software downloadable	AT&T 5ESS, Northern Telecom DMS-100	V.120, Northern Telecom T-Link	Data protocols	User-selected data on B or D channels	Circuit-switched data	$795 to $1,395
Unifi Communications, Inc. **Billerica, Mass.** **(508) 663-7570**	PhoneServer	Applications platform for switching ACD calls via ISDN BRI services	Voice/data adapter MCA/PC workstations; support for the firm's Distributed Call package that includes 4 application modules; includes phone set and PC; X.25 PAD	AT&T 5ESS, Northern Telecom DMS-100 support scheduled for March 1992	V.120	Protocol-transparent	User-selected data on B or D channels	Circuit-switched data, circuit-switched voice, packet-switched data, B or D channels	10-agent system costs $60,000 (includes ISDN hardware, PC, software for application); each additional agent costs $1,500

ACD = Automatic call distribution
API = Application program interface
BRI = Basic Rate Interface
DMI = AT&T's Digital Multiplex Interface
EISA = Extended Industry Standard Architecture
H0 = 384K bit/sec (contiguous bit stream)
H11 = 1.536M bit/sec (contiguous bit stream)
MCA = Micro Channel Architecture
NA = Not applicable
NIST = National Institute of Standards and Technology
PRI = Primary Rate Interface
SDDN = AT&T Software-Defined Data Network

This chart includes a representative selection of ISDN terminal adapters, telephone sets and adapter boards. These vendors may offer other similar products, and other vendors not included may offer a full range of products. Some vendors not listed did not respond to the survey or do not offer ISDN customer premises equipment. Readers should contact vendors directly for price and product feature information.

SOURCE: KANUPKE ASSOCIATES, INC., HADDONFIELD, N.J

(continued from page 39)

different departments, locations and companies worldwide over a single twisted-pair circuit. This enables users to mix voice and data on the same physical circuit, for instance.

Some ISDN offerings, such as voice-only telephones and PBXs, support mainly voice. Others are designed to work mainly with data devices such as multiplexers and microcomputer terminal adapter boards, while still others, such as terminal adapters and ISDN telephones, support both voice and data (see charts starting on page 40).

The ISDN equipment currently available enables users to take advantage of several ISDN features, including automatic number identification (ANI), automatic callback and digital data transmission.

This equipment supports ISDN applications that fall into six categories: voice, high-quality audio, image, video, data and multimedia communications.

Some applications fitting into each category have already been developed, and more are on the way. To take advantage of these applications, users need to buy new equipment or modify existing gear to make sure they have the D-channel signaling needed to access a BRI or PRI circuit.

Application support

Following is a brief description of each application category:

- **Voice networking.** ISDN service and telephones can naturally replace analog lines and telephones. In addition, ISDN will enable users to get quicker BRI-based digital circuit installation from carriers.

In some cases, it is even less expensive to install a BRI than to install two comparable analog circuits. Furthermore, BRI installation offers the opportunity

NETWORK WORLD

ISDN PBXs

Company	Product	Description	Features	ISDN switch/service compatibility	ISDN network interfaces	How to upgrade non-ISDN PBX to ISDN compatible	Price
AT&T Business Communications Systems Bridgewater, N.J. (908) 658-6000	Definity Generic 1 and Generic 2	ISDN-compatible PBX supports up to 32,000 lines; ISDN BRI and PRI interfaces	Provides interface for both analog and ISDN BRI sets on station side; AT&T Digital Communications Protocol phones; AT&T PC terminal adapter; calling party ID; integrated voice/data; speeds up to 64K bit/sec; PRI ANI routing to ACD module; synchronous speeds up to 64K bit/sec; V.35 and RS-232 interfaces; asynchronous speeds up to 19.2K bit/sec	AT&T 4ESS and 5ESS, Northern Telecom, Inc. DMS-100 and DMS-250; AT&T Megacom, Megacom 800, SDDN up to 384K bit/sec, ISDN INFO-2 (ANI) and Call-by-Call; compatible with MCI Communications Corp. and US Sprint Communications Co. ISDN PRI and switched digital services	PRI	Must have Generic 2 software; hardware costs $3,730 per card; BRI software is included in Generic 2; System 75 to Generic 1 PRI costs $11,500	$800 to $1,000, not including BRI sets (1); ISDN BRI phone sets: the 7505 set (no data) costs $450, and the 7506 ISDN set (with data) costs $700
Ericsson Business Communications Anaheim, Calif. (714) 533-5000	MD110	ISDN-compatible PBX supporting PRI and BRI interfaces; supports up to 20,000 lines	Interfaces both analog and ISDN BRI sets; data speeds up to 64K bit/sec; ACD module; Ericsson DBC103 analog phone sets, DBC600 digital phone sets including BRI; PRI ANI station ID support to desktop sets	AT&T 4ESS and 5ESS, Northern Telecom DMS-100 and DMS-250; AT&T ISDN PRI, Call-by-Call, INFO-2 (ANI)	PRI	Must have BC6 software and PRI trunk interface; pricing expected to be announced in first-quarter 1992	NA
Fujitsu Business Communications Systems, Inc. Phoenix (602) 921-5900	F9600 ISDN PBX	ISDN-compatible PBX supports up to 9,600 lines; ISDN BRI and PRI interface	Provides interface for both analog and ISDN BRI on station side; Fujitsu ISDN phone sets; supports nonproprietary ISDN BRI phone sets; PRI ANI routing; Call-by-Call; calling party ID; asynchronous speeds up to 19.2K bit/sec and synchronous speeds up to 64K bit/sec; provides Nx64 RS-232 and V.35 interfaces	AT&T 4ESS and 5ESS, Northern Telecom DMS-100 and DMS-250; compatible with ISDN PRI offerings from AT&T, MCI and US Sprint; supports ANI and switched services, including AT&T SDDN, US Sprint VPN and MCI Vnet	PRI	NA	NA
Harris Corp. Novato, Calif. (415) 382-5083	Harris 20-20	ISDN-compatible PBX supports up to 1,920 lines; ISDN PRI interface	Digital PBX; ISDN PRI trunk interface; Harris digital telephones; asynchronous to 19.2K bit/sec; synchronous to 64K bit/sec; PRI ANI and Call-by-Call support; RS-232 interfaces	AT&T 4ESS testing under way; Northern Telecom DMS-250 testing scheduled for late 1991	PRI	For single PRI, hardware costs $5,000 and software costs $13,000	$600 to $800 per line for PRI system (1)
Hitachi America, Ltd. Norcross, Ga. (404) 446-8820	HCX5000 Series	Family of ISDN-equipped PBXs; provide ISDN PRI interfaces; line size from 416 to more than 6,000 lines	Provide interface for both analog and ISDN BRI on station side; Hitachi ISDN phone sets; asynchronous to 19.2K bit/sec; synchronous to 64K bit/sec; ANI routing to ACD module; RS-232 and V.35 interfaces; support calling/called line ID	AT&T 4ESS and 5ESS, and Northern Telecom DMS-250; compatible with ISDN PRI offerings from AT&T, MCI and US Sprint; supports AT&T SDN, Megacom 800, Megacom and Accunet	PRI	Hardware and software cost $4,500 to $7,000 for upgrade	NA
InteCom, Inc. Allen, Texas (214) 727-9141	IBX Series	Family of ISDN-equipped PBXs; line size from 3,300 to 22,000 lines	Switches provide ISDN PRI interface; InteCom digital phones; asynchronous to 19.2K bit/sec; synchronous to 64K bit/sec; PRI ANI and Call-by-Call support BRI connections from central office; RS-232 and V.35 interfaces	AT&T 4ESS and 5ESS, Northern Telecom DMS-100 and DMS-250; comply with ISDN PRI offerings from AT&T, MCI and US Sprint; supports ANI	PRI	Require current software release; hardware costs $5,000	$600 to $900 per line for ISDN PRI interface (1)
NEC America, Inc. Melville, N.Y. (516) 753-7000	NEAX 2400	PBX supports ISDN BRI and PRI interfaces; supports up to 23,552 lines	PBX supports analog, digital and ISDN BRI set; NEC digital phones; asynchronous to 19.2K bit/sec; synchronous to 64K bit/sec; Call-by-Call support and ANI routing	AT&T 4ESS and 5ESS, Northern Telecom DMS-100 and DMS-250; complies with ISDN PRI offerings from AT&T, MCI and US Sprint; supports ANI	PRI	Must have current NEAX 5200 software release; hardware costs $2,800	Fully featured ISDN PRI model costs $850 to $950 per line
Northern Telecom, Inc. Richardson, Texas (214) 437-8000	Meridian 1 Communications System	Mendian 1 is a merger of SL-1, SL-100 and SuperNode into ISDN-capable product line to serve up to 60,000 lines	Digital PBX; ISDN PRI trunk interfaces; interfaces Nothern Telecom ISDN phones and non-ISDN phones on the station side; Northern Telecom ISDN phones and terminal adapters; PRI ANI support and Call-by-Call; RS-232 and V.35 interfaces; asynchronous to 19.2K bit/sec, synchronous to 64K bit/sec; Meridian Link for host-to-PBX connections and applications; will support CCITT-compliant ISDN phone sets	AT&T 4ESS and 5ESS, Northern Telecom DMS-100 and DMS-250; complies with ISDN PRI offerings from AT&T, MCI and US Sprint; supports ANI, Call-by-Call	PRI	Basic software costs $8,795, software for 100-line system costs $5,300; 1,000-line system costs $21,000	1,000-line system with ISDN features costs $700 per line
Siemens Private Communication Systems Boca Raton, Fla. (407) 994-8800	Saturn	Saturn supports line sizes from 24 to 1,000 extensions over PRI	Digital PBX can be upgraded to ISDN PRI to support ANI and Call-by-Call; asynchronous to 19.2K bit/sec; synchronous to 64K bit/sec; interfaces Siemens non-ISDN phone sets on station side; RS-232 and V.35 interfaces; ANI displayed on DYAD phones	AT&T 4ESS and 5ESS, Northern Telecom DMS-100 and DMS-250; complies with ISDN PRI offerings from AT&T, MCI and US Sprint; supports ANI and Call-by-Call	PRI	Cost to add CorNet ISDN hardware module is approximately $15,000; additional PRI interface cards cost $4,000 each	An ISDN-equipped model costs from $400 to $1,000 per line based on software features and station sets (1)
Rolm Co. Norwalk, Conn. (203) 849-6000	9751 Model Series	9751 is a family of ISDN PRI-capable PBXs that supports up to 20,000 lines	PBX supports up to 12 PRI trunk cards; analog and Rolm digital phone interfaces; synchronous to 64K bit/sec; PRI ANI and Call-by-Call support; supports IBM CallPath and AS/400 host to applications; passes caller ID to station sets; Rolm BRI phone sets planned	AT&T 4ESS, Northern Telecom DMS-100 and DMS-250; compatible with PRI from AT&T Call-by-Call, SDN and SDDN, MCI Vnet and US Sprint VPN	PRI	User must have current software Release 9005.1.73; hardware costs $9,000 for 1 PRI span	$700 to $900 per for new 1,000-line system with ISDN (1)

ACD = Automatic call distributor
ANI = Automatic number identification
BRI = Basic Rate Interface
NA = Not available
PRI = Primary Rate Interface
SDDN = AT&T Software-Defined Data Network
SDN = AT&T Software-Defined Network
Vnet = MCI Virtual Network
VPN = US Sprint Virtual Private Network

FOOTNOTE:
(1) Estimate based on 1,000-line PBX with 2 PRI trunks and mix of 500 lines of 2,500 sets and 250 lines for voice/data feature phones. Several PBX vendors were reluctant to provide pricing information for their respective products. Users should contact PBX vendors directly.

This chart includes a representative selection of ISDN PBXs. These vendors may offer other similar products, and other vendors not included may offer a full range of products.

SOURCE: KANUPKE ASSOCIATES, INC., HADDONFIELD, N.J.

to give users various enhanced telephone services such as the ability to assign multiple phone numbers to a single phone attached to a BRI circuit.

ISDN enables users to assign a maximum of 64 different telephone numbers to a single BRI circuit, instead of using an individual line for each number or a PBX capable of supporting a hunt group. ISDN will deliver the dialed phone number over the BRI circuit to the phone receiving the call, where it can be displayed on a screen.

Several ISDN personal computer plug-in cards also offer integrated voice messaging/processing features that allow the personal computer and ISDN adapter to store and play back recorded voice messages and prompts.

■ **High-quality audio.** Recently, researchers have been looking into ISDN's ability to improve sound quality far above an analog circuit. This ISDN equipment can use ISDN switched 64K, 128K or 384K bit/sec circuits to transmit high-quality audio in full duplex.

Several ISDN audio applications were demonstrated at the recent Communications Managers Association show in New York, including high-quality audioconferencing and delivery of prerecorded music to consumers over a single BRI B channel.

Considerable development is under way in Europe and Japan for audio-on-demand transmission of narrowband digital audio for in-store advertising and promotions over B channels.

In the U.S., the Center for ISDN Research at Stevens Institute of Technology in Hoboken, N.J., is researching compressed digital audio over ISDN B channels. And some new ISDN telephones with speakerphones offer improved sound quality.

■ **Image.** The concept of storing and transmitting images is beginning to take hold because new digital image scanners are providing better reproductions of original pictures at affordable prices and high-bandwidth circuits such as those offered by ISDN are making it possible to send those images quickly.

Imaging enables real estate brokers to exchange photos of houses and insurance companies to transmit photos of accident scenes to headquarters for quicker claim settlements. It also enables draftsmen and architects to exchange engineering drawings.

By implementing ISDN, users can send images over the two B channels of a BRI, over carrier services that use the B channels of multiple BRIs, including Nx56/64K bit/sec services, or over circuits based on ISDN's 384K bit/sec H0 channel and 1.536M bit/sec H11 channel.

■ **Video.** The hottest ISDN application today is videoconferencing over both BRI and PRI facilities. Capabilities for compressed bandwidth video and full-motion video are available today. Many of the vendors listed in the charts offer products that support video-

(continued on page 53)

NETWORK WORLD

ISDN multiplexers, concentrators, gateways and PADs

Company	Product name	Description	Features	ISDN switch/service compatibility	Network interface	Treatment of bandwith	Price
Aristacom International, Inc. Alameda, Calif. (415) 748-1500	PRI/370	Host access system that provides host and PBX channel connections to ISDN PRI services	Data only; links channels of IBM, Amdahl Corp., National Advanced Systems, Inc. mainframes to PRI 23 B+D; links ISDN CPE, PBXs and IBM hosts to BRI 2 B+D; third-party PCTA support; host-to-PBX applications	AT&T 4ESS and 5ESS, Northern Telecom, Inc. DMS-250; AT&T INFO-2, Call-by-Call; US Sprint Communications Corp. VPN and ISDN services	PRI	Contiguous H11 channel	$75,000
AT&T Network Systems Morristown, N.J. (800) 222-7278	Packit PAD multiplexers; models include Packit/6 and Packit/30	PAD multiplexers for multiplexing asynchronous terminals to ISDN BRI services, also host connections	Data only; concentrate asynchronous and ISDN B or D channels onto ISDN B or D link channels; HostPAD/TerminalPAD; speeds up to 19.2K bit/sec; AT&T and Hayes Microcomputer Products, Inc. AT Command Set; RS-232, X.28 and X.29 host interfaces; connects up to 30 asynchronous terminals to BRI	AT&T 5ESS	BRI	User-selected B- or D-channel data	Packit/6 costs $1,995; Packit/30 costs $5,995
Ascend Communications, Inc. San Francisco (415) 397-9015	Multiband	Concentrator for multiplexing ISDN BRI and PRI B channels, switched 56K bit/sec channels onto PRI; video, LAN and host connections to ISDN	Data only; concentrate asynchronous channels onto B channels; RS-232 interface; speeds up to 64K bit/sec; supports ISDN PRI H0 channel and H11 channel speeds; supports ISDN BRI 128K bit/sec; non-ISDN switched digital services (Nx56)	AT&T 4ESS and 5ESS, Northern Telecom DMS-100 and DMS-250; AT&T SDDN (H0 channel), SDN (Nx56/64K bit/sec); US Sprint and MCI ISDN PRI services and switched digital Nx56/64K bit/sec	BRI/PRI	Contiguous H0 channel or H11 channel; inverse multiplexing Nx56/64K bit/sec	$14,000
	Pipeline; models include Pipeline 4 and Pipeline 17	Concentrator connects asynchronous host computers to ISDN BRI	Data only; concentrate up to 32 sessions over B channels; uses both BRI B channels for data connectivity; RS-232 interface; supports speeds up to 64K bit/sec	AT&T 5ESS and Northern Telecom DMS-100	BRI	User-selected B- or D-channel data	Prices start at $14,900
Combinet Sunnyvale, Calif. (408) 522-9020	INTERCHANGE ISDN LAN Adapter	Bridges remote LANs via ISDN BRI B channels	Data only; BRI adapter; RS-232, V.35 and V.24; connects token rings and Ethernets; supports speeds of up to 64K bit/sec and 128K bit/sec over B channel (Nx64K bit/sec); IBM 3174 coaxial elimination; application program interface; media access control-level bridge	AT&T 5ESS, Northern Telecom DMS-100, Nippon Telegraph and Telephone Corp. INS, INS 64, Information Network System Packet Switching and Superdigital	BRI	Inverse multiplexing Nx64K bit/sec	$1,395
Develcon, Inc. Dublin, Calif. (415) 829-8200	I-GATE; models include 8011 and 8012	Multiplexer/gateway for ISDN and non-ISDN device connections to BRI; data conferencing applications	Data only: connects asynchronous terminals and Ethernet TCP/IP LANs to ISDN; asynchronous to 19.2K bit/sec, synchronous to 64K bit/sec; data terminal conferencing card	Telecom Canada Transpac, Datapac and X.25 on B or D channel	BRI	User-selected B- or D-channel data	$9,500 to $13,900
Digital Equipment Corp. Maynard, Mass. (603) 884-3110	ISDNcontroller 100	Host gateway that enables VAXes to access ISDN BRI services; provides ISDN access for VAX hosts over ISDN BRI services	Data-only plug-in adapter board; connects DEC Q-bus VAX hosts via 2 ISDN B channels for speeds up to 64K bit/sec on each B channel	AT&T 5ESS; complies with Telecom Australia Macrolink, France Telecom Numeris and Deutsche Bundespost Telekom	BRI	User-selected B-channel data	$4,000
DigiBoard, Inc. St. Louis Park, Minn. (612) 943-9020	ISDN NetLink	Interface boards that enables IBM PC, AT and XT to act as a LAN gateway to ISDN BRI services	Data-only IBM-compatible PC resident plug-in adapter; high-speed to 128K bit/sec over ISDN BRI B channel; access to NETBIOS LAN resources; B-channel circuit/packet switched, data calls, B and D channel X.25 packet connections	AT&T 5ESS	BRI	X.25 multiplexing	$1,495
Gandalf Data, Inc. Wheeling, Ill. (708) 541-6060	Starmaster Primary Rate Module	Gateway for linking low-speed data devices to BRI services	Data only; asynchronous and synchronous; asynchronous speeds up to 19.2K bit/sec and synchronous up to 64K bit/sec; TCP/IP connections; PRI interface	Northern Telecom DMS-100 and DMS-250; ISDN PRI services from US Sprint and MCI, including Nx56/64K bit/sec	PRI	User-selected B-channel data	$8,000
General DataComm, Inc. Middlebury, Conn. (203) 574-1118	Megamux TMS	Terminal and host connectivity to ISDN PRI	Data only; 23 B+D; multiple PRI interfaces; ISDN PRI H0 channel; H11 channel, bandwith on demand: utilizes the firm's multiplexer resident ISDN aggregate card/T-1 card	AT&T 4ESS, 5ESS and Northern Telecom DMS-100 and DMS-250; AT&T SDDN (H0 channel), SDN (Nx56/64K bit/sec); US Sprint and MCI ISDN PRI services, switched digital Nx56/64K Australia Macrolink NTT INSNet 1500	PRI	Contiguous H0 channel or H11 channel	$15,000
ISDN, Inc. Greensboro, N.C. (919) 282-7636	ISDN Asynchronous Mux	PAD multiplexer that provides protocol conversion and terminal connectivity to ISDN BRI	Data only; asynchronous speeds up to 19.2K bit/sec; RS-232; ISDN protocol conversion; Hayes AT-compatible; 8-port unit	AT&T 5ESS and Northern Telecom DMS-100	BRI	User-selected B- or D-channel packet data on FIFO basis	$4,900
Larse Corp. Santa Clara, Calif. (408) 988-6600	Diversi-T	Network multiplexer that provides interface to ISDN PRI switched services for video, image and LAN-to-LAN interconnection	Data only; V.35 interface; speeds in any multiple of 56K or 64K bit/sec to H11 channel; 1-, 2- and 3-card slot models; H0 channel support	AT&T 4ESS and Northern Telecom DMS-250; AT&T SDDN H0 channel, H11 channel; ISDN PRI services from US Sprint/MCI	PRI	Contiguous H0 channel or H11 channel	$6,800
Microcom, Inc. Norwood, Mass. (617) 551-1000	MLB5500	LAN bridge supports Ethernet or IBM Token-Ring LAN connections over ISDN BRI	Data only; dial-up connectivity over 56K bit/sec and 64K bit/sec for switched circuits for LAN connections; V.35 interface	AT&T 5ESS	BRI	User-selected B-channel data	$9,199
Network Express, Inc. Ann Arbor, Mich. (313) 761-5005	NE Series, models include 2000/3000/4000	Family of switched network controllers that connect LANs to ISDN PRI and switched digital services	Data only; family of switched digital controllers; LAN interfaces include Ethernet, token ring, 10Base5, 10Base2 and FDDI; V.35 interface; speeds in any multiple of 56K or 64K bit/sec up to H11 channel	AT&T 4ESS, 5ESS and Northern Telecom DMS-100 and DMS-250; AT&T SDDN H0 channel, SDN Nx56/64K bit/sec; US Sprint and MCI ISDN PRI services; NTT Japan INSNet64/1500	PRI/BRI	Contiguous H0 channel or H11 channel	$7,000
Newbridge Networks Corp. Herndon, Va. (703) 834-3600	TAP Series; models include 2000/2100/5000/5500	Family of PRI access products for connecting PBXs, hosts and LANs to PRI	Voice and data capabilities; bandwith on demand; speeds in any multiple of 56K and 64K bit/sec up to H11 channel; Nx56/64K bit/sec and H0 channel; RS-232 and V.35 interfaces	AT&T 4ESS and 5ESS, Northern Telecom DMS-250 test scheduled for December; AT&T SDDN H0 channel, SDN Nx56/64K bit/sec, Call-by-Call	PRI	Contiguous H0 channel or H11 channel	TAP 2000 costs $9,000; TAP 2100 costs $6,000; TAP 5500 costs $4,000; TAP 5000 costs $5,000
OST, Inc. Chantilly, Va. (703) 817-0400	LANXPAND-INTER and LANXPAND-IN	LAN gateway that provides protocol conversion and terminal connections over ISDN BRI services	Data only; TCP/IP LAN interconnection; utilizes PC SNET plug-in card for wide-area connections: LAN-XPAND-IN model uses NETBIOS interface	AT&T 5ESS and Northern Telecom DMS-100	BRI	User-selected B- or D-channel circuit or packet data	LANXPAND-IN model costs $1,000; LAN-XPAND-INTER model costs $1,750
Promptus Communications, Inc. Portsmouth, R.I. (401) 683-6100	T-1 CommServer+	LAN bridge/router that provides terminal connectivity, bandwith on demand, video and LAN connections over ISDN PRI	Data only: on-board channel service unit; PRI interface to switched ISDN and non-ISDN services: speeds up to H11 channel; V.35 and RS-422 interface; Nx56/64K bit/sec and H0 channel	AT&T 4ESS and Northern Telecom DMS-250; AT&T SDDN H0 channel and H11 channel; AT&T International PRI; ISDN from US Sprint VPN Nx56/64K bit/sec, MCI Virtual Network Nx56/64K bit/sec	PRI	Contiguous H0 channel or H11 channel; inverse multiplexing Nx56/64K bit/sec	$7,800
Teleos Communications, Inc. Eatontown, N.J. (908) 389-5700	IAP 6000	Controller/server that provides terminal, host, LAN connectivity and call routing; ISDN and non-ISDN connections via PRI	Voice/data premises controller; connects BRI, PRI T-1, non-ISDN interfaces; 6- and 20-slot versions; concentrates ISDN/non-ISDN connections onto multiple PRIs; connects non-ISDN PBXs, ACDs to ISDN PRI H0 channel and H11 channel	AT&T 4ESS and 5ESS, Northern Telecom DMS-100/250; AT&T SDDN H0 channel and SDN Nx56/64K bit/sec; US Sprint and MCI ISDN PRI services and switched digital Nx56/64K bit/sec services; AT&T ANI	PRI	Contiguous H0 channel or H11 channel	$15,500 base configuration
	IRX 9000	Controller/applications platform that provides call distribution, telemarketing and data connectivity to token ring; IBM AS/400 interfaces, IBM CallPath applications development	Connects ACDs, PBXs and analog sets to ISDN PRI; supports IBM CallPath connectivity; token-ring interface; BRI, PRI and T-1 interfaces; supports IBM CallPath/400 Command Set and AS/400 reports	AT&T 4ESS and 5ESS, Northern Telecom DMS-100 and DMS-250; AT&T SDDN H0 channel, SDN (Nx56/64K bit/sec; US Sprint and MCI ISDN PRI services and switched digital Nx56/64K bit/sec services; AT&T ANI	PRI	Contiguous H0 channel or H11 channel	$25,000 base configuration
Timpelex, Inc. Woodcliff Lake, N.J. (201) 391-1111	ISDN Gateway Server	Multiplexer/server that provides terminal and host connectivity to ISDN PRI	Data only; connects ISDN and non-ISDN CPUs, CPE and LANs to ISDN PRI; supports speeds to H11 channel; V.35 and RS-422 interfaces	AT&T 4ESS, 5ESS and Northern Telecom DMS-100 and DMS-250; AT&T SDDN H0 channel and SDN Nx56/64K bit/sec; US Sprint and MCI ISDN PRI services, switched digital Nx56/64K bit/sec, MCI ISDN PRI services and switched digital Nx56/64K bit/sec	PRI	Contiguous H0 channel or H11 channel	$12,000 to $24,000

ACD = Automatic call distributor
BRI = Basic Rate Interface
CPE = Customer premises equipment
CSU = Channel service unit
FIFO = First In, first out
H0 = 384K bit/sec (contiguous bit stream)
H11 = 1.536M bit/sec (contiguous bit stream)
INS = Information Network System
PCTA = Personal Computer terminal adapter
PRI = Primary Rate Interface
SDDN = AT&T Software-Defined Data Network
SDN = AT&T Software-Defined Network
VPN = US Sprint Virtual Private Network

This chart includes a representative list of vendors offering ISDN-capable multiplexers, concentrators, gateways and PADs. Vendors not included may offer a full range of competitive products. Readers should contact vendors directly for price and product feature information.

SOURCE: KANUPKE ASSOCIATES, INC., HADDONFIELD, N J

Despite small decline, ISDN prices still high

Although the average price of telephones that work with Integrated Services Digital Networks declined by approximately $150, as compared with prices listed in last year's ISDN equipment Buyer's Guide, the units are still more expensive than non-ISDN telephones.

In some cases ISDN phones cost three or four times the price of a non-ISDN set.

Still, deals are available, and when a mass ISDN market emerges — probably in the next two to three years — prices are likely to start dropping.

Until then, local exchange carriers and phone set distributors are offering innovative rental and leasing programs, making the capital expenditure less of a burden.

ISDN telephones are available for use in three configurations: connected to an ISDN Centrex service, connected to a single-line ISDN Basic Rate Interface (BRI) service and installed behind an ISDN-equipped private branch exchange.

Of the 100,000 ISDN telephones that Kanupke Associates, Inc. estimates have been shipped so far, 99% have been for use with ISDN Centrex. The remaining sets have been used for BRI-behind-PBX applications and single-line BRI services.

Here's an examination of phone set equipment and pricing by vendor:

■ **AT&T.** The communications giant recently announced two new phone sets — the 7506 and 7507 — which offer an application program interface (API) and call management features previously unavailable in earlier models. AT&T's proprietary API enables users to write applications that allow the phone set and an attached data terminal to use a BRI circuit for transport.

AT&T is also using the Hayes Microcomputer Products, Inc. AT Command Set for ISDN application development in these units. This enables AT&T ISDN phones to support any AT command set-compatible application.

AT&T offers stand-alone voice sets and sets with integrated data modules, for which the asynchronous capability runs up to 19.2K bit/sec. The units' synchronous throughput extends up to a B channel's 64K bit/sec data rate. Models include the 7500, 7505, 7506, 7507, 7514, 6504 and 6508. Prices range from $400 to more than $1,600 for a high-end voice/data station.

The Models 7505, 7506 and 7507 are designed to operate with the AT&T Definity PBX.

AT&T phone sets will not work with BRI service provided from a Northern Telecom, Inc. or Siemens central office switch.

■ **Northern Telecom.** This company has a more limited product family than any of the other phone set vendors, but is second to AT&T in terms of market share of telephones shipped.

Like AT&T, Northern Telecom uses the Hayes AT Command Set with its telephones. Its phone sets offer asynchronous speeds up to 19.2K bit/sec with an optional RS-232 data port.

Northern Telecom sells the M5209T set in three versions: voice only, voice with packet data and voice with circuit- and packet-switched data.

One price given as an example is $435 for the standard voice-only M5209T. These phones only work with Northern Telecom's DMS line of central office switches and its Meridian line of PBXs.

■ **Fujitsu Business Communication Systems.** Fujitsu utilizes its innovative plug 'n' play cartridge design to upgrade its phone set easily to support new versions of switch software.

Fujitsu's telephones offer asynchronous data speeds up to 19.2K bit/sec and synchronous speeds up to 64K bit/sec via a V.35 interface. The list price for the high-end voice/data sets is $740.

The models include the 1050 and 2000, which support either the AT&T 5ESS or the Northern Telecom DMS-100.

■ **Telrad Telecommunications, Inc.** Telrad has been a participant in the ISDN market since its early days. Some of its ISDN models support voice only, while others support voice and data. The latter interface to RS-232 and V.35, and support asynchronous speeds up to 38.4K bit/sec and synchronous speeds up to 64K bit/sec.

The company's models include the 285, 286 and 287, which are priced from $500 to $1,000. Telrad ISDN phones operate with both AT&T and Northern Telecom central office switches.

It seems likely that ISDN key systems will appear soon and the telephones that work with them will include both ISDN-compliant and proprietary models.

— Chuck Kanupke

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conferencing at speeds from 128K bit/sec over two ISDN B channels to 1.536M bit/sec over an H11 channel.

Some offerings such as Ascend Communications, Inc.'s Multiband and Promptus Communications' T-1 CommServer+ use inverse multiplexing to support video transmission over carriers' Nx56/64K bit/sec services, including those based on BRI B channels.

These units can, for instance, spread a high-speed data stream of 384K bit/sec received from a videoconference coder/decoder at a sending site across three different BRI circuits, consisting of a total of six B channels. Each BRI can take a physically different path to the receiving site, where a companion unit makes sure the 384K bit/sec data stream is properly reassembled.

Several ISDN terminal adapter and personal computer terminal adapter (PCTA) board vendors, including Fujitsu Network Switching of America and Dale, Gesek, McWilliams & Sheridan, Inc. (DGM&S), support video transmission over both B channels of a BRI circuit at 128K bit/sec.

■ **Data.** Although packet-switched alternatives such as frame relay and Switched Multimegabit Data Service are competing for attention, circuit-switched links such as ISDN B channels will often remain more economical for linking hosts and local-area networks as well as for linking terminals to hosts, multiplexers, controllers and private networks.

There are also security considerations. The party sending the data over ISDN circuits can be identified through ANI, which enables users to block network access to that caller. Packet services have not yet worked out such provisions.

■ **Multimedia.** ISDN can be used to support multimedia applications, most of which currently involve the transmission of a voice call on one BRI B channel and data on the other BRI B channel.

This enables users to integrate call processing and management functions with the data processing functions of a computer on a single circuit.

By taking advantage of ISDN's ability to use multiple B channels or B and D channels, users can design applications that identify incoming callers and simultaneously route a voice call and customer data information to an agent.

This enhances customer service operations, increases agent efficiency and strategically positions the firm to use public network intelligence to compete in local, regional and national markets.

While this application is important, ISDN's standard features are its main benefits. Products capable of accessing a BRI or PRI line provide unified access to carrier services.

With these interfaces, users can transmit traffic that would typically require a separate access circuit over an ISDN circuit.

This integration capability reduces the number of access circuits and amount of equipment needed to tap into different carriers' voice and data services.

Choose your gear

Understanding the applications ISDN can support will help users select the proper equipment.

For instance, users looking to simply link a data device to a BRI circuit could opt for a stand-alone ISDN terminal adapter or PCTA. The market for these products has become crowded during the past year.

Eight new PCTA vendors appear in this year's charts, including IBM, Apple and DGM&S, one of the first vendors to offer ISDN customer premises equipment in the U.S.

A terminal adapter connects an asynchronous or synchronous device to an ISDN circuit. A PCTA is a plug-in card designed to interface Apple Macintosh, IBM and IBM-compatible personal computers to an ISDN BRI or PRI circuit.

Some of these products include an RJ-11 port that enables users to link a telephone set to a BRI circuit.

To the dismay of many end users, list prices for PCTAs continue to remain relatively unchanged from last year. Hayes Microcomputer Products, Inc. ($1,599), Teleos Communications, Inc. ($1,395) and ICL North America ($2,195) have not altered their prices since 1990. New offerings from IBM ($1,195), Apple ($1,095) and DGM&S ($1,395) are in the same general price range.

The basic reason that prices remain high is the lack of a mass market. Many vendors are offering products in this category. But the shortage of fully developed ISDN applications for personal computers and hosts and the relative scarcity of BRI services have kept many customers from buying ISDN adapters.

Another problem is the lack of interoperability among customer premises equipment due to vendors' proprietary implementations of ISDN standards.

In many cases, terminal adapters and PCTAs work with application-specific software that, for instance, makes it easy for two microcomputers to communicate over a BRI circuit.

Many equipment vendors have developed their own applications, while others have teamed with software developers and carriers to jointly develop applications. Still others are offering application development platforms that provide the signaling ser-

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vices interface and the application framework to enable end users and developers to produce new applications.

High-end personal computer cards and adapters are being designed to support various PRI switched digital services such as AT&T's 384K bit/sec service, which is based on ISDN's HO channel, and 1.536M bit/sec service, which is based on ISDN's H11 channel.

Many of these same products are capable of supporting Nx56/64K bit/sec switched digital services offered by MCI Communications Corp. and US Sprint Communications Co.

Looking at the PCTA market uncovers a few anomalies. For example, DGM&S, Hayes, ICL, NCR Corp., Teleos and others offer high-performance products, costing from $1,000 to $1,900, that use 16-bit microprocessors capable of executing more than one million instructions per second when processing integrated voice/data and real-time applications.

Since these boards have their own processors, they allow the personal computer to run standard application software. Subsequently, these PCTAs are more expensive than offerings from AT&T and others such as Link Technology. Products without an on-board processor generally cost about $500.

The high-end boards also offer the flexibility to send circuit-switched and packet-switched data simultaneously over B channels or any combination of B- and D-channel configurations. However, no PCTA supports two simultaneous B-channel voice conversations at the same time.

PBXs

It's well known that ISDN enables users to employ ANI, but this capability is just one of the many ISDN features users can attain when connecting one or more PBXs via a PRI service.

Using PRI to interconnect PBXs enables users to take advantage of D-channel signaling to transparently bring all ISDN features — for example, calling-party name and number, as well as number ring-again or number redial — to each PBX in the network. It may also lead to simplified billing and the need for fewer trunks.

ANI's use in telemarketing has been widely promoted. But ANI also has great potential for managing voice processing systems. By delivering the calling party's billing number to the customer premises, the technology gives users the opportunity to develop innovative approaches to call management. The utilization of the calling number indicates how the call should be routed and how it should be handled by the answering agent.

In addition, calls originating from an ISDN PBX can pass station identifiers — numbers that identify which extension is placing a call — to the carrier. This enables users to take advantage of precall identification capabilities — such as look-ahead routing, which prevents calls from being relayed to busy circuits.

Look-ahead routing uses the D channel to determine if the number dialed from an extension is busy before the PBX seizes a trunk to set up the actual call. If the line is busy, the D channel instructs the PBX to send a busy tone to the extension.

One of the critical issues facing PBX users is the cost of upgrading an existing non-ISDN PBX to give it ISDN functionality.

Analog PBXs require the use of an adjunct peripheral that provides the analog-to-digital conversion required to support ISDN services on a nondigital PBX. These adjuncts convert an analog PBX's signaling to digital signaling and then map it onto an ISDN D channel. This approach is both expensive and difficult, but it is the only way ISDN services can be supported on an analog PBX.

To support D-channel signaling, a non-ISDN digital PBX requires both hardware and software upgrades. The cost of upgrading a digital PBX will vary depending on the software upgrades and components required.

Several of the vendors listed in the charts provided prices to upgrade to ISDN functionality, but many others were reluctant to discuss pricing issues due to intense competition. Adding ISDN PRI to an ISDN-capable PBX can cost as little as $4,000 or as much as $50,000, depending on the PBX model and ISDN features desired.

Installing ISDN phone sets

Another issue for users to consider is the cost of adding ISDN phone sets to their PBXs. BRI telephone sets range from $400 to $1,000, depending on features (see "Despite small decline, ISDN prices still high," page 53).

Unfortunately, most digital telephones that work with ISDN PBXs do not fully comply with BRI standards. Currently, all PBX vendors continue to use proprietary terminal interfaces, telephone sets and signaling protocols on the line, or customer premises, side of their products — rather than using the BRI specifications.

The CCITT ISDN standard does not require the use of BRI signaling on the line side of PBXs, but it does not prohibit its use either. If vendors did offer that capability, users would be able to use any standard BRI phone with their switches. That could set off competition in the sale of ISDN telephones for PBXs, a development PBX vendors have traditionally avoided.

PBX vendors view ISDN telephones as a lucrative add-on business in a market that is otherwise flat. For this reason, they will likely try to keep their switches working with only a limited number of phone sets.

Currently, at the high end of the ISDN

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customer premises equipment marketplace are products that combine signals from multiple ISDN and non-ISDN devices onto one or more PRI lines.

Use of the H0 and H11 channels is becoming increasingly popular, as are the Nx56/64K bit/sec services of carriers. Such equipment enables users to interconnect LANs and support other applications such as videoconferencing, telemarketing, host-to-host file transfers, data backup and call management.

A new breed of high-end PRI controllers and adapters offered by Ascend Communications, Network Express, Promptus Communications and others will spawn a growing awareness that PRI switched digital services are economically attractive for such applications.

Industry experts and consultants expect virtually all of the T-1 multiplexer companies to offer PRIs and BRIs on their hardware systems in the near future.

Timeplex, Inc. and General DataComm, Inc. offer PRIs today. Recently, Newbridge Networks, Inc. announced numerous ISDN PRI products, including offerings that support access to Nx56/64K bit/sec services as well as ones that link analog PBXs to a PRI. Network Equipment Technologies, Inc. has chimed in by providing an ISDN PRI statement of direction.

Multiplexer vendors such as Dowty Communications, Inc., Gandalf/Infotron, Codex Motorola, Tellabs, Inc., AT&T Paradyne and Racal-Milgo will have no choice but to offer PRIs as their customers create hybrid networks that use PRI switched digital services in conjunction with leased lines.

AT&T Communications, Inc. recently announced plans to offer a Temporary Signaling Communication service to its PRI users. This provides a User-to-User Information (UUI) signaling feature in the D channel, thereby enabling PRI users to generate short messages in the channel that could be used to initiate the unintrusive monitoring of their circuits and ISDN customer premises equipment.

Products that support this UUI feature will provide users with improved diagnostic and network performance information.

Developers have been reluctant to design personal computer applications with limited user appeal and terminal portability.

▲▲▲

Compatibility promises

While various vendors' equipment enables users to benefit from ISDN services, not all equipment can operate with every central office switch nor can all ISDN customer premises equipment interoperate. These incompatibilities fly in the face of the original intention of ISDN, which was to provide end-to-end digital voice and data connectivity through a single set of interfaces.

Differences in the way carrier equipment and customer premises equipment makers implemented ISDN standards caused these interoperability problems.

AT&T, Northern Telecom, Inc. and other central office switch vendors offer ISDN-compatible switches and equipment, but with varying interfaces, service features and capabilities. These nonstandard implementations have significantly inhibited the widespread adoption of ISDN.

The fragmentation caused by the regional Bell holding companies' proprietary service implementations has limited the rate at which ISDN customer premises equipment and software costs will fall in the near future.

Until all vendors and carriers make ISDN equipment and services compatible, users will be limited to picking only the equipment that works with certain services. They will also have to pay a premium to buy that equipment.

Fortunately, the fragmentation of ISDN may soon pass. This year, major ISDN industry participants, including carriers, vendors, the RBHCs, Bell Communications Research and the Corporation for Open Systems International, began to publish an evolving specification defining a set of baseline technical standards that will mandate a multivendor, multinetwork structure for ISDN called National ISDN 1.

By implementing National ISDN 1, different vendors will enable their central office switches to exchange BRI voice and some data calls ("Carriers attempt to bridge ISDN islands," *NW*, Nov. 11).

All the vendors listed in the charts indicate they plan to support National ISDN 1. Some customer premises equipment vendors indicate they are already beginning to rewrite their software to conform to National ISDN 1 specifications. Testing of products complying to the specification will occur at Bellcore and RBHC labs starting in the middle of 1992.

Users who buy ISDN BRI equipment before National ISDN 1 is deployed should find out from their vendors how currently installed equipment and any additional purchases will be upgraded. Users should also require vendors to show that they have passed National ISDN 1 compliance testing before they buy.

Unfortunately, PRI equipment still has major interoperability problems. PRI services are not covered by the National ISDN 1 technical references; therefore, proprietary central office implementations will probably continue until the release of the National ISDN 2 specification late next year.

This incompatibility of local exchange switches and PRI services will likely result in vendors offering products with a protocol conversion capability until compliance occurs.

The lack of a standard ISDN implementation has also resulted in incompatible application program interfaces (API) used to develop ISDN-based personal computer applications. Currently, many PCTA vendors offer a variety of incompatible personal computer APIs, which inhibits widespread application development and deployment.

Software developers have been reluctant to design personal computer applications with limited user appeal and terminal portability. A desktop application written for a Hayes PCTA cannot easily be ported to a personal computer with another vendor's PCTA.

Fortunately, the National Institute of Standards and Technology and the North American ISDN Users Forum have been leading the effort to author a standard API.

But until a standard is defined, the price of PCTAs and prestandard applications will remain relatively high for most large users and unjustifiable for smaller users.

Despite these incompatibility problems, the ISDN customer premises equipment market has experienced unprecedented growth in the past year. Vendors have rushed products out in order to better position themselves in the looming ISDN sweepstakes.

And it's likely that during the next few months, more customer premises equipment vendors will enter the market, giving end users even more sophisticated, intelligent products and systems from which to choose. ◪

NETWORK WORLD

10Base-T adapter cards (correction from Oct. 7 issue)

Company	Product	System and bus	8-, 16- or 32-bit	Architecture	Drivers	Management	Diagnostics	Connections	Other features	Price/warranty	Distribution
Racal InterLan, Inc. Boxborough, Mass. (508) 263-9929	NIA310-BT	Apple Computer, Inc. Macintosh IIs with NuBus, full-slot	32-bit	16K-byte RAM, dual-ported memory	National Center for Supercomputing Applications Telnet, Apple's AppleTalk Phase I, II, A/UX	SNMP agent, Etherscope	Software, 1 link LED	RJ-45	Etherscope packet analyzer free; Signaling System 7 compatible	$329/lifetime	Distributors, OEMs, resellers
	NI5210/8-10BT	IBM PC AT, XT, clones	8-bit	8K-byte RAM, dual-ported memory	Novell, Inc. NetWare 286/386, ODI, PC/TCP, Microsoft Corp. NDIS, 3Com Corp. 3+Share, Digital Equipment Corp. DECnet, DEC DOS PCSA, PC-NFS, STREAMS (SCO ODT, XENIX, ISC)	SNMP agent, Roll Call Management	Software, 1 link LED	RJ-45, AUI	Extended distance support, option BOOT ROM	$259/lifetime	Distributors, OEMs, resellers
	NI5210/16-10BT	PC AT, XT, clones	8-bit	16K-byte RAM, dual-ported memory	NetWare 286/386, ODI, PC/TCP, NDIS, 3+Share, DECnet, DOS PCSA, PC-NFS, STREAMS (SCO ODT, ISC)	SNMP agent, Roll Call Management	Software, 1 link LED	RJ-45, AUI	Extended distance support, option BOOT ROM	$279/lifetime	Distributors, OEMs, resellers
	NI6510-10BT	PC AT, XT, clones	16-bit	BusMaster	NetWare 286/386, ODI, NDIS, DECnet, DOS PCSA, PC-NFS, STREAMS (SCO ODT, ISC)	SNMP agent, Roll Call Management	Software, 1 link LED	RJ-45, AUI	Extended distance support, optional BOOT ROM	$279/lifetime	Distributors, OEMs, resellers
	NI9210-10BT	PS/2, Micro Channel Architecture, compatibles	16-bit	18K-byte RAM, dual-ported memory	NetWare 286/386, ODI, NDIS, PC/TCP	SNMP agent, Roll Call Management	Software, 1 link LED	RJ-45	Extended distance support	$429/lifetime	Distributors, OEMs, resellers

AUI = Attachment unit interface
ISC = Interactive Systems Corp.
NDIS = Network Driver Interface Specification
ODI = Open Data-Link Interface
ODT = Open DeskTop
PC-NFS = Sun Microsystems, Inc.'s Personal Computer-Network File System
PCSA = Digital Equipment Corp.'s Personal Computer Systems Architecture
PC/TCP = Personal computer/Transmission Control Protocol
SCO = The Santa Cruz Operation, Inc.
SNMP = Simple Network Management Protocol
STREAMS = Unix Version 3's framework for network communications
XENIX = SCO's version of Unix

This chart includes a representative selection of 10Base-T adapter cards. These vendors may offer other adapter cards, and other vendors not included may offer a full range of products.

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Windows to be universal?

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Microsoft is attempting to take advantage of the explosive growth of Windows in the evolving network market.

"Since the server side will remain heterogeneous, we believe there is greater potential for users to have a homogeneous environment at the desktop," said Mike Murray, general manager of the Network Business unit at Microsoft.

With the universal client architecture strategy, Microsoft's aim is to increase network functionality from the desktop while simultaneously shielding the user from the complexity of the net.

In order to achieve this, the company plans to build some net functionality directly into Windows and provide future versions of Windows and Windows NT — the 32-bit upgrade of the operating system due out next year — with open network interfaces ("Microsoft's LAN Manager plans may herald NOS shift," *NW*, Nov. 11).

For example, Microsoft will add to Windows the Service Provider Interface (SPI), which will act as a generic interface for services such as logon, authentication and directory. If other vendors enhance their products to support drivers to these interfaces, Windows could provide transparent and simultaneous access to different nets.

The Microsoft view

By pursuing this strategy of enabling client workstations to support a mix of network services based on different protocols, Microsoft could broaden the choices in the multivendor network marketplace and simplify their use.

However, the company's view does not stop with simply providing network access. With its Mail Application Programming Interface and last week's announcement of the Open Database Connectivity interface, Microsoft is also positioning Windows to be the common interface for various messaging applications, database servers and other network applications (see "Microsoft establishes API for database connectivity," page 2).

Current users usually do one of two things when they are finished with a file: save it or print it.

In the future, Windows users would also have multiple network options at their disposal that would be as simple as selecting a save or print option. These future choices include forwarding the file through electronic mail, sending it over a facsimile gateway or storing it in a remote database.

So far, this has been difficult to provide because application vendors have not been willing or able to write drivers for the vast number of network devices and protocols.

But with Windows, application vendors providing front-end clients will only have to accommodate one application program interface (API) to Windows, while network and peripheral vendors can write drivers to the SPI on the back end.

As is the case in the current database market, this will enable users to mix and match front ends and back ends from different vendors as long as they support common interfaces.

"When users select options from applications, Windows will be hiding which specific network vendors or resources are providing those services," said David Thacher, senior product manager in the Networking Business unit at Microsoft.

If broad industry support coalesces around this future Windows model, it could provide users with a simple way of accessing a range of network resources, applications and data.

Additionally, a common Windows interface providing access to various network servers and resources could simplify net administration in installation, upgrades and on-line help functions. And with all users working in Windows, training requirements could be reduced because many network functions would remain hidden from users.

Most importantly, software developers could finally deliver long-awaited distributed applications and groupware because this type of Windows environment would simplify development efforts with the common API.

Since almost every major software house is already developing Windows applications based on the premise of providing a better user interface, it seems that these vendors would be even more likely to embrace Windows if it supported a wide range of network devices and protocols.

Extending the desktop

Another benefit of Windows would be the ability to extend some of its desktop features over the network. For example, Windows provides a specification called the Dynamic Data Exchange (DDE) that allows users to cut and paste data from one Windows application to another. Some vendors are now introducing products that extend DDE support over a network — something Microsoft may address in a later version.

The use of DDE extended over a LAN or modem link could have significant implications for the way networks are designed and the implementation of new applications, such as multimedia, which requires specific software and hardware.

All these developments could prompt network and application vendors to reposition their products to better fit the Windows model. Some vendors could even redeploy programming resources that have been committed to client interface development in the past.

Although Microsoft has made progress with its latest version of Windows 3.0 and the future vision is becoming clearer, networking in Windows today is still an add-on capability. Analysts predict that much of this new networking functionality is at least 18 months away.

Only time will tell how successful Microsoft will be in its attempt to leverage its desktop strategy to further its networking objectives, but analysts caution that the company should not be too greedy.

"It's a new model for networking," said Jamie Lewis, editor of the "Clarke Burton Report" in Salt Lake City. "Microsoft is talking about openness now, but if key pieces are held back for its own purposes, it will cripple the effort."

NSA pack supports APPC

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"The real advantage to NSA's product is it supports so many different connectivity options," said Rust, noting that the product will soon support Banyan Systems, Inc.'s VINES LANs.

Rust said the beta version of DynaComm/Elite APPC, which his company is using with a token-ring driver, has on occasion caused applications to crash but he is confident NSA will work out the bugs. "They've been very good about helping us and working with us. They've got excellent support," Rust said.

DynaComm/Elite APPC also has an application program interface that works with any programming language that supplies Windows Dynamic Link Library calls.

Alternatively, programmers can employ the built-in DynaComm script language, an application development tool that has been enhanced to support APPC.

In SDLC and 802.2 LAN environments, DynaComm/Elite APPC turns a Windows machine into an IBM PU Type 2.1 Low Entry Networking (LEN) node, which can communicate with other Systems Network Architecture Type 2.1 nodes as peers. LEN nodes have slightly less functionality than IBM Advanced Peer-to-Peer Networking end nodes.

DynaComm/Elite APPC will be available in the first quarter of 1992. It costs $495 for a stand-alone version with coaxial cable, SDLC and 802.2 drivers. Network licenses for IPX/SPX and NETBIOS LANs are priced at $2,995 for a maximum of 32 users and $4,995 for up to 128 users.

Videoconference going multisite

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from different suppliers.

Most suppliers say equipment based on the CCITT H.261 videoconferencing standard provides inferior picture quality compared with their proprietary transmission formats, Lowenstein said.

Despite foot-dragging on standards, suppliers are adding features to video bridges that will make it easier and less expensive for users to conduct multisite videoconferences.

For example, PictureTel recently announced the M8000 bridge, which sends audio and video signals in the same bit stream instead of requiring users to establish a separate circuit for audio. The new bridge also supports both dedicated and dial-up connections, allowing users to tie together sites on and off a private network.

MetLife's Yee said conducting multipoint videoconferences is no different than running point-to-point videoconferences.

"We conducted a four-site videoconference that lasted 7½ hours the day after we installed our bridge," Yee said.

Citicorp builds SONET network

continued from page 1

pensive than using T-3 facilities.

Both Teleport and New Jersey Bell had to install Alcatel Network Systems, Inc. SONET multiplexing and lightwave transmission equipment in their central offices to complete the SONET link.

"We wanted the ability to use a drop-and-insert multiplexer in a Teleport central office to redirect circuits to other locations [on the Teleport network] because we needed a rather large amount of bandwidth between the offices," said George Prina, Citicorp's network manager. "It struck me that a SONET system could easily take care of both of these requirements."

Citicorp began working with Teleport and New Jersey Bell last summer and turned up the SONET link just a few weeks ago. Prina said he was impressed by how well the two carriers worked together on the project.

The company has installed Alcatel TM-50 Terminal Multiplexers from General DataComm Industries, Inc. at its headquarters on Wall Street as well as the Parsippany data center. The devices multiplex T-1 lines onto a SONET Optical Carrier (OC)-1 fiber-optic link running at 51.84M bit/sec.

Using terminals linked to RS-232 ports on the multiplexers, the company is able to monitor the performance and reconfiguration of circuits on the access line.

"This gives us the capability from our [TM-50] terminal at each end of the link to reconfigure it at will," Prina said. "We can turn up additional T-1s and redirect T-1s, which is especially useful for contingency planning."

The fiber-optic line's light signal is passed through an Alcatel Add Drop Multiplexer (ADM)-50 at Teleport's point of presence in the World Trade Center.

The ADM-50 lets Citicorp redirect bandwidth in 64K bit/sec and T-1 portions to other sites in Teleport's fiber-optic net. In essence, the ADM-50 serves as a digital access and cross-connect system (DACS).

"We have all the advantages of a T-1 DACS in Teleport," Prina said. "It gave us most of the capabilities we had with T-1 networking but at the T-3 level."

Traffic from Teleport is passed over a SONET OC-1 link to an ADM-50 in New Jersey Bell's Newark central office.

The ADM-50 transforms light pulses into a Synchronous Transport Signal (STS)-1 sent over a coaxial cable connection to a Fiber Transport System 600, which combines up to 12 STS-1 or T-3 lines onto a fiber-optic link running at 622M bit/sec (SONET OC-12) between Newark and New Jersey Bell's Morristown central office.

A Fiber Transport System 600 in Morristown demultiplexes the light signal into STS-1s that are sent to an ADM-50, which directs traffic over a SONET OC-1 link to Citicorp's Parsippany office.

Before deciding on the SONET link, Prina compared the technology to T-3 service. The slowest SONET line rate, 51.840M bit/sec, is faster than the T-3 rate of 45M bit/sec.

The SONET link can also support line rates up to 2.488G bit/sec.

"The demand for bandwidth between those two points is increasing rather quickly," Prina said.

Citicorp will need far more bandwidth if it decides to use the SONET link to support 100M bit/sec links between Fiber Distributed Data Interface LANs. "We're toying with the idea of using FDDI, but we haven't laid any firm plans," Prina said.

Even with a onetime charge to cover the cost of installing central office gear, SONET was less expensive than a T-3 link. "It wasn't big money, but at the beginning of the year, we were looking at saving a couple thousand dollars a month," Prina said.

Teleport and New Jersey Bell charged Citicorp a onetime installation fee under a special assembly arrangement that helps the carriers recoup costs for gear used by only one customer.

Prina declined to give pricing for the SONET and T-3 links.

Software aids in drafting RFPs

continued from page 2

Besides making the analysis easier, the DOS-based software helps users create RFPs by providing a four-layer outline. The outline provides space to describe the overall project and then prompts users to break the project into various sections and subsections for further description.

The bottom layer is where users list exact specifications for the product or service they wish to purchase.

When users finish writing the RFP, it is sent via diskette to vendors bidding on the project. Vendors check one of the responses listed after each specification to indicate that their product either meets the spec exactly, comes close to meeting it, needs modification to meet it, is currently under development or cannot meet it.

The RFP also enables the vendors to attach a short comment about their response to each specification. These responses usually refer to comments in paper documents that vendors send in with the diskette.

Upon receiving the diskettes, users upload the information into The Product Analyzer database, a relational database from Progress Software Corp., so it can be scored and compared to other vendor responses.

The product calculates a raw score based on the numeric total of a vendor's responses as well as a weighted score that emphasizes the importance of certain specifications.

Customers define how much weight to give each of the five standard responses.

For example, they can determine that vendors indicating they can meet a specification exactly earn 12 points, while responses indicating they cannot meet it carry a two-point deduction.

Customers can also define how much weight to give each specification. Vendor responses are multiplied by a factor between one and 10 that is based on the overall importance of that specification to the bidded project.

The combination of raw and weighted scores can help users better differentiate among vendor proposals, according to Spano.

SSSI has developed a module that lists specifications for purchasing 39 core banking applications, including software for loan and deposit systems, accounting and payroll.

The firm has also developed a module that defines exact specifications for purchasing a private branch exchange, including specifications for trunks, stations, cabling and automatic call distribution software.

The Product Analyzer costs $6,995, and the banking module costs $29,995. The price of the PBX module depends on the size of the PBX. All items are available now.

For more information, call Spano at (407) 841-4578.

Tool gets LU 6.2, VTAM support

continued from page 6

er blocks of data, Telepartner officials said.

Until now, LU 6.2 has not been a major requirement among Synchrony users because of the preponderance of terminal-to-host Systems Network Architecture nets that use LU 2, said Ken Dixon, vice-president of the Synchrony business group for Telepartner.

> "The same technology today is still going to be very important 18 months from now," said Ken Dixon.
>
> ▲▲▲

"People are still looking for DOS, LU 2 and LAN support," he said. "The same technology today is still going to be very important 18 months from now. But where are things going? [To] Windows, LU 6.2 and OS/2."

VTAM support will not only open up a new base of users for Synchrony, but will also enable the company to expand into the European market, where VTAM is widely deployed, according to Dixon.

Telepartner has been marketing Synchrony since September 1990. It purchased distribution rights to the product two years ago from Travelers Insurance Co., where the product was developed to automate distribution of software updates.

Telepartner estimates that Synchrony, which can distribute software to multiple sites simultaneously, can save companies an average of 80% over the cost of mailing diskettes or transferring files on a site-by-site basis.

Synchrony Version 2.2 is available now. It costs $30,000 for the Communications Manager, $295 for the Administrator and OS/2 Workstation. The DOS Workstation software costs $195.

An optional batch data interface, which allows users to share information between mainframe applications, such as IBM's Time Sharing Option and Information Management System, workstations, costs $15,000.

Microsoft rolls out new pack

continued from page 2

pendently with other messaging systems and mail servers. Eventually, this interface will be incorporated directly into a version of Windows.

Server capabilities

On the server side, Mail 3.0 will provide global directory synchronization to automatically update directories on all Microsoft Mail servers within a network. Through gateways, Mail 3.0 will also work with other mail systems such as IBM's Professional Office System and the Simple Mail Transfer Protocol.

In addition, Microsoft Mail will support file encapsulation, which will preserve formatting, file attachments and embedded objects across foreign mail backbones such as X.400.

Microsoft believes that over time all vendors' operating systems will incorporate more of the messaging and directory functions that used to be required in applications.

"Applications won't need to worry about where data came from or where it is going," said Daniel Petre, general manager of the work group applications business unit at Microsoft.

When this happens, new work group applications will be designed as network services built around a common API and accessible through Windows at the desktop (see "Windows to be universal interface?" page 1).

Many of these new applications will be mail-enabled and based on Microsoft's emerging Mail Application Programming Interface.

Database front

On the database front, Microsoft has based its ODBC API on the Call Level Interface (CLI) specification set by the SQL Access Group, a consortium made up of more than 40 database vendors and some large, influential users.

> By leveraging its base of Windows developers, Microsoft believes it can promote the ODBC API as a potential standard.
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CLI is intended to make it possible for CLI-compliant front-end SQL tools to access different back-end SQL database servers. In the past, application developers had to develop separate front ends for each database vendor.

By leveraging its base of Windows developers, Microsoft believes it can promote the ODBC API as a potential desktop standard since these vendors will be able to write front-end applications that share common database drivers from Windows.

In addition, Microsoft expects the ODBC API to help minimize support requirements for software developers and database vendors since all of them could support Windows and the same open CLI.

According to John Robertson, chairman of the SQL Access Group, Microsoft has the full support of its members, including ASK Computer Systems, Inc.'s Ingres division, Informix Software, Inc., Oracle Corp. and Sybase, Inc.

Microsoft Mail Version 3.0 for PC Networks costs $695 and includes a single workstation license for any platform. It is scheduled for shipment in the second quarter of 1992.

Current Microsoft Mail users can upgrade to Version 3.0 for $295 per server. Workstation software licenses are available in five-user packages for $395, 20-user versions for $1,349, 100-user packages for $5,500 and 500-user packs for $22,500.

The Microsoft Developer Kit for ODBC is scheduled to be available in the first half of 1992, along with a core set of ODBC drivers to ensure immediate data access capabilities.

ODBC is expected to be incorporated into a future version of Microsoft's Windows after Version 3.1 comes out next year.

Borland readies to embrace groupware

SCOTTS VALLEY, Calif. — Borland International, Inc. last week outlined its groupware strategy but declined to provide a definite time frame for rolling out any new products.

Ken Einstein, director of application strategy at Borland, said that instead of providing a proprietary groupware system, the firm will offer groupware functionality similar to that found in Lotus Development Corp.'s Notes by building on its current object-oriented tools and database technologies.

Einstein declined to provide specific product details, but he did say Borland would build groupware products on top of its current database products, including dBASE, Paradox and InterBase, using tools such as its C++ object-oriented programming language.

Borland recently acquired InterBase when it purchased Ashton-Tate Corp. Einstein said the triggers and event timers inherent in InterBase are perfect for applications such as form routing in a work group environment. An application could be designed to route a form to a different user if, for example, a certain action had not occurred by a specified time.

Einstein also said InterBase has the ability to handle Borland Large Objects, which can store large blocks of data, such as images or video, within a database field.

"You could store a whole block of text, such as a 100-page contract, in one field in the database," he said. A work group application that needed to track and route large word processing or spreadsheet files, for example, could be built on top of InterBase to provide this functionality.

Peter Kastner, vice-president of Aberdeen Group, Inc., a consultancy in Boston, said, "I believe InterBase is a strategic product on which Borland can build a considerable number of groupware products and services."

Richard Finkelstein, president of Performance Computing, Inc., a consultancy in Chicago, agreed. "[A groupware document management] application could very well be built on top of a database," he said. "Borland may do it in their new Interbase product, which can handle large objects."

Borland is also looking to provide a group calendaring product. Einstein said the company's current SideKick II offering already has the ability to reconcile calendar systems on different personal computers. "We may be trying to provide more support like this as we develop work group applications," he added.

He said current groupware products, such as Notes, force the user to abandon current technology and work completely within the Notes environment.

"We're not likely to build that kind of a closed system," he said. "Everything we're trying to do is based on an open architecture."

Einstein declined to say when Borland will release groupware products but noted that Microsoft Corp. has announced a two-year time frame for its first groupware offerings (see "Microsoft rolls out new client/server E-mail pack," page 2).

"That gives us a pretty big window of opportunity," he said.

— Joanne Cummings

Firm mulls service to route calls to agents

continued from page 6

The PhoneServer's own database will determine which of the home agents is free to handle the call. The product will then send the call with the caller's data file to that agent.

Each agent's home must be equipped with an ISDN BRI line in a virtual private network so the PhoneServer can route the call.

"The call and the database information should arrive at the same time," explained William Flood, director of technical planning at Ameritech Services, who last week announced the company's plans during a presentation at the North American Telecommunications Association conference here.

Flood said the PhoneServer will replace a Rockwell International Corp. ACD system currently used by the company.

Well-equipped database

The PhoneServer controller, a Unix-based Intel Corp. 80386 or 80486 computer equipped with BRI cards, contains a database listing of information on the number of agents and their line statuses.

The PhoneServer tracks which agents are busy so it knows where to direct calls. It also sends data on agent activity to a supervisor's workstation, where it is compiled for review.

Computers used by home agents must be equipped with a Unifi ISDN card capable of communicating an agent's activity status to the PhoneServer.

Glenn Bloom, manager of marketing programs at Unifi, said the company's ISDN cards are programmed to transmit information about the duration of calls back to the PhoneServer.

Bloom said the PhoneServer equipment is in beta test and will be shipped during the first quarter of 1992. At that time, Unifi will also make available an ISDN phone set with a four-line display to be used by home agents.

The PhoneServer could also reroute incoming calls to company agents outside of Ameritech's region via interexchange carriers' BRI services.

"The virtual logical automated call distribution can be across the U.S. or international," Flood said. "You only need an ISDN line [that costs] $30 month."

The fact that Unifi equipment does not have to be collocated in a central office is viewed as a plus by Ameritech Services, Flood noted.

Customers can purchase PhoneServer as a piece of customer premises equipment.

Flood said Ameritech Services considers such a call distribution service to have vast potential in the business communications market.

The beta test will last until June. Ameritech Services will then decide if it should tariff a call distribution service based on the PhoneServer equipment. ◻

Groups mull plan for U.S. business net

continued from page 1

could play a crucial role in promoting U.S. competitiveness.

"We spend a lot of time in America beating ourselves over the head about the Japanese," said George Kuper, president of the Industrial Technology Institute, a manufacturing research group in Ann Arbor, Mich., and one of the four EINet promoters. "We have a far greater command of information and communications technology [than the Japanese] and the power of a diversified supplier base."

"If we can link those things, it will be the salvation of the American industrial base," Kuper added.

The other groups promoting EINet are the Iacocca Institute of Lehigh University in Bethlehem, Pa., the National Center for Manufacturing Sciences in Ann Arbor and Sematech, a semiconductor research consortium here. These groups plan to use EINet internally and encourage its use among their members and associates.

MCC also expects its owners and associates to use EINet. MCC is owned by 22 corporations, including Andersen Consulting, Bell Communications Research and Digital Equipment Corp. It has more than 50 associate members and government sponsors, including AT&T, the Defense Advanced Research Projects Agency (DARPA), Lawrence Livermore National Laboratory and United Technologies Corp.

EINet will be run by MCC's new Enterprise Integration division, which will receive about a quarter of the consortium's $55 million budget and lead MCC development efforts for such technologies as distributed data management systems for enterprise nets.

MCC officials plan to cut over EINet in March. The officials said many details of the EINet architecture will be finalized once a service provider is selected.

Users will access the net via private lines from their premises to the nearest point of presence. MCC will supply the software to use EINet services. Initially, EINet will support both electronic messaging and bulletin board services. MCC, for example, will electronically publish listings and analyses of major interoperability standards and projects worldwide.

Additionally, MCC plans to offer security services, including user authentication and management of public and private encryption keys. MCC also intends to offer interoperability services for application-level protocols and to link EINet with an X.500 directory being developed by DARPA on a pilot basis for the Internet.

By the second quarter of 1992, MCC plans to let companies offer commercial value-added services over EINet, such as publication of electronic catalogs for ordering goods and services. MCC also intends to offer software distribution services and a full array of electronic data interchange services. The consortium will expand EINet's slate of interoperability services over time, as technologies advance.

Service charges

User companies with more than $500 million in yearly revenue will pay $60,000 annually to access EINet, while companies with $50 million to $500 million in annual revenue will pay $30,000 per year and companies with less than $50 million in annual revenue will pay $10,000 per year.

Users will pay extra for transmission services.

Bob Wilson, marketing coordinator for MCC's Enterprise Integration division, said it should cost less than $20,000 annually for dedicated 56K bit/sec access to EINet. ◻

Defense Dept. taps RBHC to overhaul net

continued from page 6

the Pentagon has 30,000.

Following a new review of user needs, Burke said, the Defense Telecommunications Service staff plans to meet with Bell Atlantic Network Services and subcontractor AT&T to direct the transition.

TEMPO, which has an estimated value of $600 million, is the Defense Department's primary contract for upgrading its local Maryland, Virginia and Washington, D.C. offices during the next 10 years. "The hope is that we can move to ISDN," Burke said.

But, emphasizing that ISDN remains only an option under the contract, he said the department will be keeping its eye on emerging technologies that might supersede ISDN.

Burke noted that the Department of Defense is still evaluating which method to employ to interconnect its mushrooming numbers of LANs but said it may implement a T-1 backbone between the Bell Atlantic Corp. central offices using Cisco Systems, Inc. routers, perhaps using Primary Rate Interface as the access mechanism.

He said the Defense Department is asking that Bell Atlantic immediately begin installation of a network management center in the Pentagon, which will be manned by personnel from both parties. He emphasized it will give the agency needed control over billing and service operations and will provide its staff with the opportunity to pick up expertise in the network management area.

"We want to ensure the life-cycle management is done the way we want," Burke said. "We want to have our hands on the whole system."

Although it will likely install large numbers of ISDN Basic Rate Interface lines, the Defense Department has structured the contract to allow the addition of "enhancements as technology evolves" so that it can take advantage of any innovations that hit the market in the next decade.

"The contract was extremely innovative in that it openly requested the contractors to bring to [the Defense Department's] attention any and all technologies within its scope of work," said Sara DeCarlo, Bell Atlantic Network Service's account manager for TEMPO.

Ironically, because the request for proposal for the TEMPO contract was issued in 1988, it calls for a proprietary version of ISDN that is now considered outdated. But Bell Atlantic Network Services and the Defense Department expect to immediately begin revisions of the deal.

Both parties acknowledge that at least 13% of the TEMPO contract will actually require the installation of analog service since many Defense Department personnel, particularly those in the Pentagon, use the encrypted AT&T Secured Telecommunications Unit III phones that require analog lines. ◻

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AT&T to air strategy

continued from page 1

Inc. ("Domino's delivers using new call routing service," *NW,* Aug. 12).

AT&T is arranging long-distance trials of a Switched Multimegabit Data Service (SMDS) as well (see "AT&T ponders inter-LATA SMDS trial," this page).

But the frame relay announcement is expected to steal the show this week.

Service details

AT&T will offer access to its frame relay service at speeds starting at 56K or 64K bit/sec and increasing in 64K increments up to T-1, said Carl Pitasi, vice-president and director of Enterprise Network Strategies at Gartner Group, Inc., a research and consulting firm in Stamford, Conn. Pitasi was briefed by AT&T last week.

Other sources said the carrier will likely offer only a handful of access speeds initially and add more as users demand them.

The IPX currently supports frame relay access ports at a maximum of 1.024M bit/sec, but sources said the switch will be enhanced to support full T-1 by the time AT&T's service is available. StrataCom has said such an enhancement is planned.

> "This is not an aggressive move by AT&T; it's a defensive move," Pitasi said.
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The two carriers currently using the IPX to provide frame relay — CompuServe, Inc. and WilTel — offer only 56K/64K, 256K and 1.024M bit/sec access ports. Sprint Data Group, which uses its own packet switches, offers a range of speeds up to full T-1. British Telecom North America, Inc. offers the service only at 56K/64K bit/sec.

Unlike other frame relay service providers, AT&T may limit users to the bandwidth they subscribe to under their committed information rate (CIR), said Jack Haverty, an internet architect at Oracle Corp. who earlier this month discussed with AT&T the possibility of using the service.

Other carriers consider the CIR a guaranteed minimum and let users send bursts of data above the CIR if bandwidth is available.

Sources familiar with AT&T's plans confirmed that the carrier will not let users exceed the CIR.

Availability of the service is expected to be widespread.

"AT&T's service will not be available in every LATA, but it will be available in the largest cities. They'll be addressing the majority of the market in the initial rollout," said Berge Ayvazian, vice-president of communications research at The Yankee Group, a Boston consultancy. "In addition, they will be extending the service to other countries with plans to introduce frame relay over the next year or so."

An AT&T spokesman would neither confirm nor deny that AT&T will announce a frame relay service this week. StrataCom also declined to comment.

Choosing StrataCom

The selection of the IPX brought mixed comments from industry watchers. Because of the switch's limited capacity, some suggested AT&T is not really committed to frame relay.

"This is not an aggressive move by AT&T; it's a defensive move," Pitasi said.

It had been widely speculated that AT&T would base its frame relay service on its own BNS-2000, a broadband switch that AT&T has been using in SMDS trials.

"My feeling is that they got desperate, needed a quick fix and decided to go with [StrataCom]," said an analyst briefed on InterSpan who requested anonymity. "Engineering problems and time constraints forced their hand."

"This is just an interim solution," said Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C. "This is your classic rebuttal to MCI, Sprint and the rest."

Jeffrey Stone, vice-president and principal at Infonetics Research, Inc., a San Jose, Calif., market research firm, agreed with Dzubeck. "This seems like more of a tactical than a strategic offering," he said. "The StrataCom boxes don't even support [frame relay access at] up to T-1 yet, and they don't support SMDS."

But other analysts said StrataCom was the logical choice.

"They are the supplier to most of the service providers already in the frame relay market," Ayvazian said. "They have the most experience building public frame relay networks."

Some observers speculated that in the long run, the IPX could be used as a feeder multiplexer to a larger cell-based backbone switch within AT&T's net.

Others said AT&T may have been in no rush to get into the frame relay market for fear the move would hurt its more lucrative private-line offerings.

"Cannibalization is always an issue for AT&T because they already have such expansive service offerings," said Barry Gilbert, an analyst at InfoCorp, a market research firm in Acton, Mass. However, AT&T had to enter the market to match rivals MCI Communications Corp. and US Sprint Communications Co., whose frame relay services could cut into AT&T's private-line business.

Contract challenge

The announcement could also provide a real test of the Federal Communications Commission ruling this summer to allow AT&T to offer services through contracts, rather than general tariffs ("FCC decisions shake up network industry," *NW,* Aug. 5).

The FCC said AT&T could offer nontariffed services under contract to business customers, although a summary of the contract would have to be filed within 14 days and similar deals would need to be made available to other users.

Pitasi said he expects other carriers to challenge AT&T on whether it can offer frame relay services under contracts. "I'm sure somebody will say it's not fair," he said, adding it is not clear which services are considered fair game for contract deals.

Ayvazian said this won't be the last service that AT&T will attempt to position as nontariffed.

> "Cannibalization is always an issue for AT&T because they have such expansive offerings."
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"The data communications services group's objective is to create a family of services outside the traditional transmission offerings, which are regulated services," he said.

Other new offerings

AT&T's new InterSpan Information Access Service, also scheduled to debut this week, will offer users a single 950 access number which they can use to dial up access to databases, messaging systems and other applications that AT&T provides on behalf of clients, Pitasi said. It will be offered at speeds from 300 to 9.6K bit/sec for a flat per-minute rate.

The InterSpan Locator Service lets retailers advertise a single telephone number nationwide for its customers to call. The service will use calling number identification information to route the call to the retail outlet nearest the caller's location.

Both services are expected to be available prior to the frame relay offering.

AT&T ponders inter-LATA SMDS trial

SEAL BEACH, Calif. — Rockwell International Corp. last week said AT&T has approached the company about taking part in an inter-LATA trial of Switched Multimegabit Data Service (SMDS).

AT&T is looking to expand the scope of the SMDS trial in which Rockwell is currently participating with Pacific Bell and GTE Telephone Operations.

In that trial, which has been under way since mid-September, Pacific Bell and GTE have established an SMDS link between a Rockwell site here and another in Canoga Park, Calif. ("Briefs," *NW,* Sept. 30). The Seal Beach site is linked to a GTE central office, while the Canoga Park location is supported by Pacific Bell.

AT&T wants to support a third Rockwell location in order to test SMDS with Pacific Bell and GTE on an inter-local access and transport area basis, said Bob Bystedt, director of telecommunications for Rockwell.

Currently, the T-1-speed SMDS link is supporting a graphics-based fluid dynamics engineering application.

Sun Microsystems, Inc. workstations attached to Ethernet local-area networks at Rockwell's Canoga Park facility use SMDS to communicate with a Cray Research, Inc. supercomputer at Rockwell's Information Systems Center here. Cisco Systems, Inc. routers located at both sites support the SMDS link, Bystedt said.

"We've been testing that, and it's been working fine," he said. "Now PacBell, GTE and AT&T want to extend it to cover inter-LATA traffic."

Details of the test, such as where the third site will be and what applications it will support, have yet to be determined, Bystedt said. He expects these details to be worked out in the coming weeks and the trial to start in the first quarter of 1992.

AT&T, GTE and Pacific Bell declined to say whether AT&T will become involved in the trial. However, a Pacific Bell spokesman said, "There is a provision in our trial [agreement] that we could extend it to include tests for inter-LATA capabilities."

— *Paul Desmond*

SynOptics 3000 supports UTP

continued from page 4

"Passive circuitry generally places more restrictions on the types of [unshielded twisted-pair] wires that can be used for high-speed token rings and supports a lesser number of nodes," Blume said.

The IEEE 802.5 token-ring standard for unshielded twisted pair will embrace both passive and active circuitry. SynOptics and IBM are proposing that the latter portion of the standard be based on their jointly developed technology.

What it supports

The Model 3505A installed in a SynOptics 3000 hub will support as many as 132 token-ring stations at a distance of as far as 100 meters from the wiring closet. It will interoperate with the company's existing 3505 UTP Token Ring Host Module, as well as with IBM's 4M and 16M bit/sec Token-Ring Adapter cards.

A comparable Proteon module supports as many as 100 Token-Ring nodes at distances as far as 85 meters and interoperates with IBM's 4M and 16M bit/sec Token-Ring Adapter cards. The module costs $2,095 and will be available in January.

NETWORK WORLD

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—*Telecommunications Manager*

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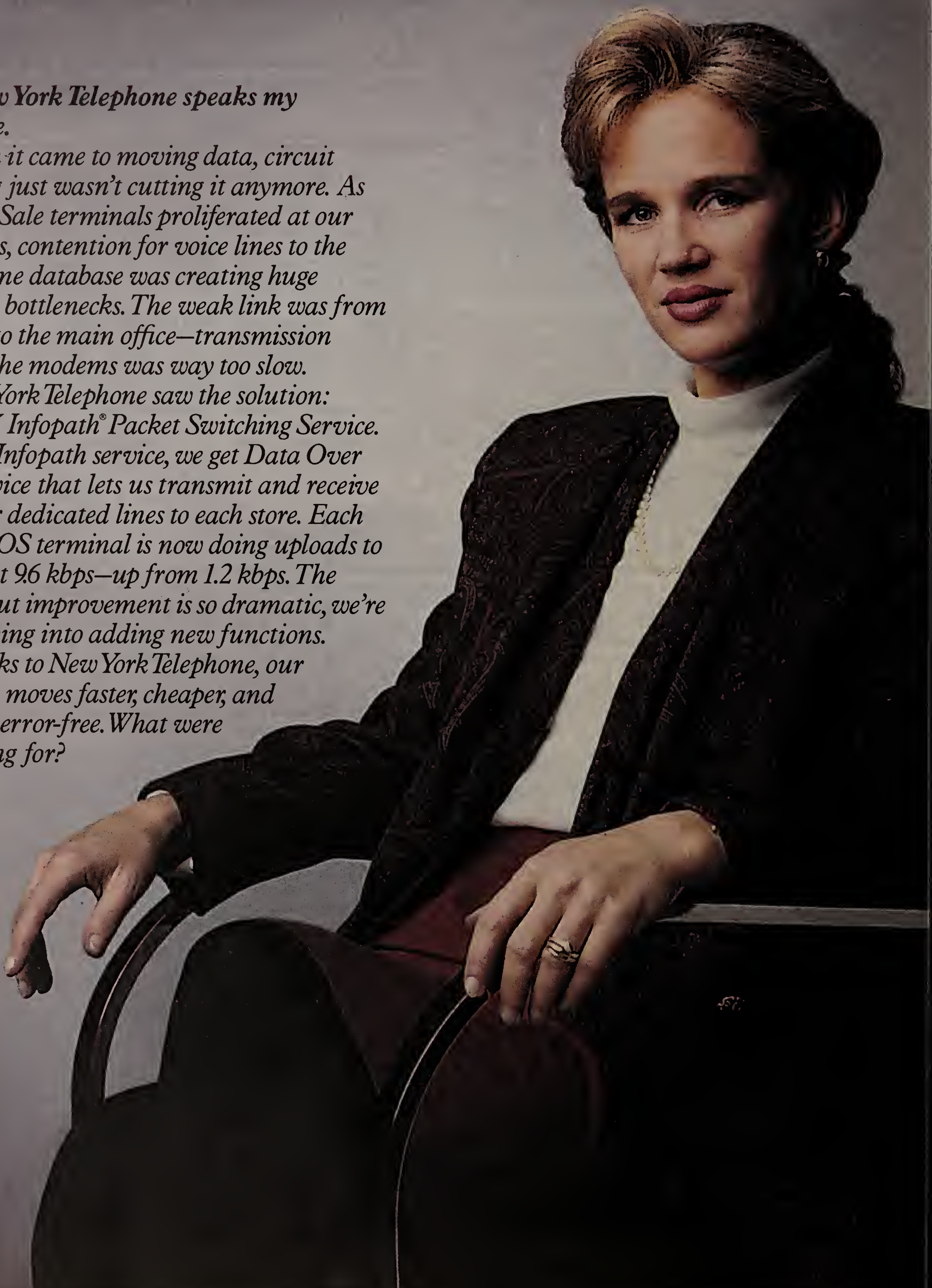

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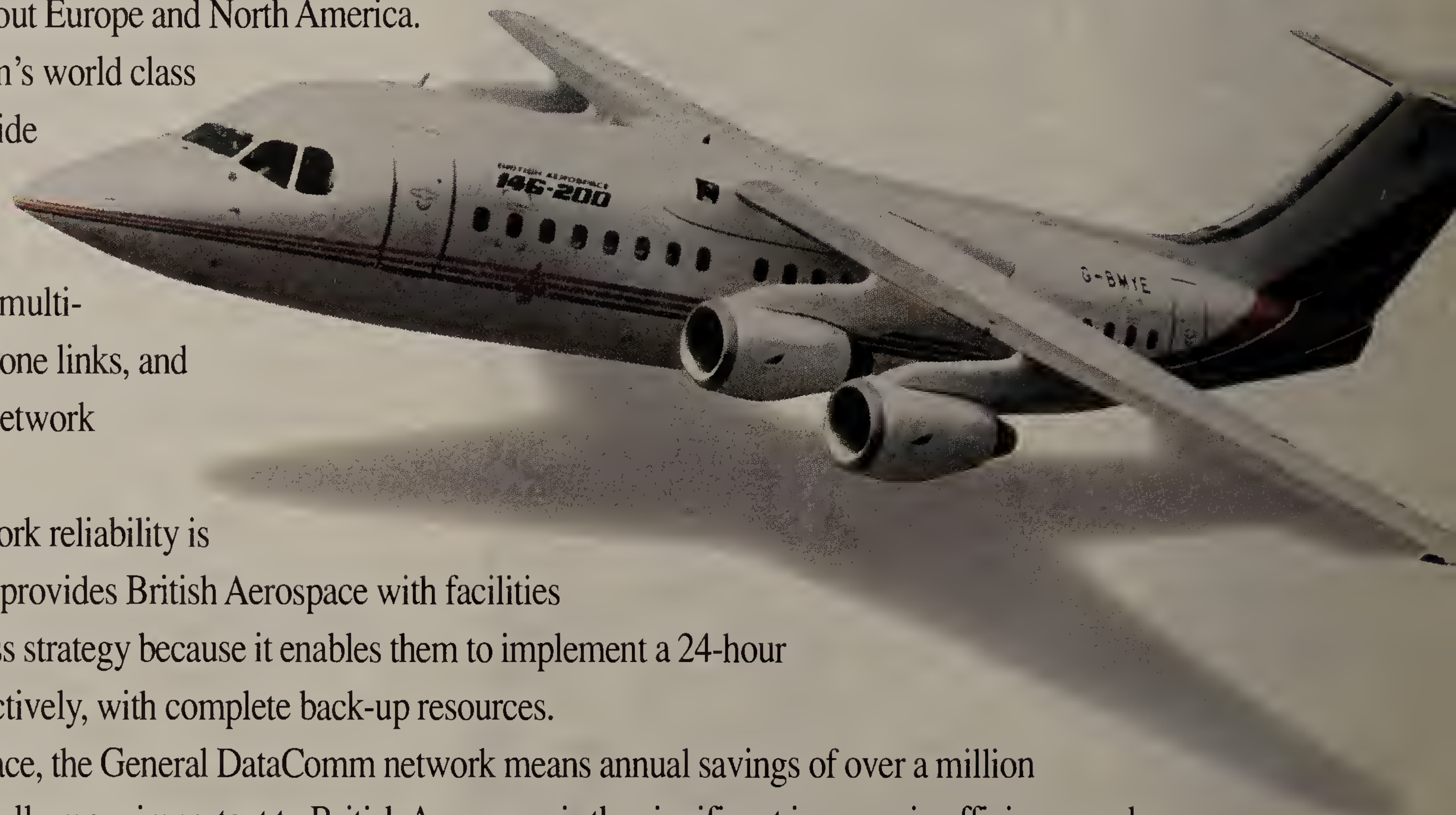

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